ANNUAL REPORT

for the fiscal year
ending March 31, 1984

Department of Mines and Energy

The Honourable Alan R. Abraham, C.D.
Lieutenant Governor of Nova Scotia

Sir:

I have the honour to submit herewith the Annual Report of the Department of Mines and Energy of the Province of Nova Scotia for the period April 1, 1983, to March 31, 1984.

Joel R. Matheson

Joel R. Matheson, Q.C.
Minister of Mines and Energy

The Honourable Joel R. Matheson, Q.C.
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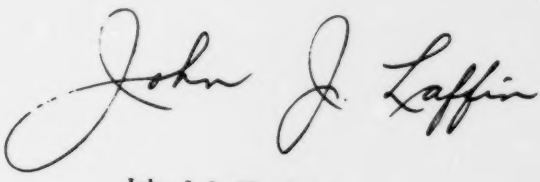

John J. Laffin, P.Eng.
Deputy Minister

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DEPUTY MINISTER'S REPORT

John J. Laffin, P.Eng., F.E.I.C.

The exploration for and development of mineral and petroleum resources of Nova Scotia continue to be of great importance to the economy of the Province. In December 1983, Rio Algom Ltd. announced its intention to develop North America's first primary tin mine near Yarmouth. Mineral production of coal, gypsum, salt, limestone, barite, anhydrite, and aggregates continued to increase during 1983/84. The value of mineral production increased from $273.8 million to $290.7 million in 1983. Over 6,400 people were employed in mineral production and related employment.

Developments in coal mining continued during the year with increased coal production at the Cape Breton Development Corporation (CBDC) mines and at the Novaco Ltd. mine at Point Aconi. In addition, CBDC is continuing work on the Donkin Development and is beginning work on the new Lingan-Phelan mine.

Gypsum production is expected to increase with the decision by two firms, Georgia-Pacific Corporation and Little Narrows Gypsum Company Ltd., to expand operations with new quarry sites.

Exploration activity for mineral commodities in the Province continued to increase. Most exploration companies kept their claims in good standing during 1983. Overall the number of exploration licenses issued increased from 1,159 in 1982 to 1,350 in 1983. The value of exploration work also increased to $6 million from $5.5 million the year before.

With all of the increases in mineral production, I am pleased to report that the industry had no fatal accidents.

Exploration for oil and gas offshore Nova Scotia reached record levels, with up to eight rigs operating at one time. Negotiations of "first round" exploration agreements were completed, bringing the total commitment to over $2 billion. Two significant gas discoveries were made (Glenelg J-48 and Arcadia J-16), adding to discovered reserves in the offshore region. The first blowout since drilling began offshore occurred in February 1984, and was successfully brought under control.

During 1983/84 work began on revising the Mineral Resources Act of 1975. The purpose is two-fold. The revision of the Act will modernize legislation and regulations to better represent increasing exploration/mining activity as well as social and administrative impacts of these activities. Secondly,

the new Act will establish Departmental policy relating to management of abandoned mine waste materials, especially from former gold producing

In March 1984 the Canada - Nova Scotia Cooperative Mineral Agreement 1981 - 1984 ended. This Agreement made $3.9 million available for geological exploration and mineral development work within the Province. During the life of the Agreement major mineral potential studies were completed for gold along the Eastern Shore and for base metals, industrial minerals, and coal in the Sydney and Loch Lomond regions of Cape Breton.

Assessment of new coal based technologies continued during the year, with the opening of a coal-water fuel pilot plant in Sydney and a fluid bed combustion pilot unit at Point Tupper.

Progress was made in several areas of planning for development of the Venture natural gas field. A review of the socio-economic and environmental aspects by independent panels found no significant adverse impacts. A development plan for the Venture project was tabled in January 1984 with the Canada - Nova Scotia Offshore Oil and Gas Board. In conjuction with this progress the Department was involved in various studies associated with this development, including *Introduction of Natural Gas to Nova Scotia* and *Propane Gas Market Pre-Build Feasibility.*

During the year, the Department prepared an Energy Supply and Demand Forecast for the period 1983 - 2005 as part of the Province's submission to the National Energy Board. Nova Scotia continued to reduce its dependence on crude oil, to a low of 68 per cent in 1983.

The work of the Department is carried out by a highly motivated and qualified staff. Their work has resulted in this Annual Report and the many publications shown in Appendix A. Also, I wish to thank the Minister for the advice and thoughtful consideration he has provided the Department.

This Annual Report shows the variety of programs and amount of work which the Department is undertaking in minerals and energy-related matters. This provincial impetus and the combination of a strong mineral industry, diversity of geological environments, a skilled workforce, and a prime geographic location continue to make Nova Scotia a desirable location for mineral and energy development.

ORGANIZATION AND PERSONNEL OF THE DEPARTMENT

ORGANIZATION

The Department of Mines and Energy is organized into six Divisions. Three of these divisions, Mineral Resources, Mineral Development, and Mining Engineering are grouped together in the Mines and Minerals Branch under an Assistant Deputy Minister. The Energy Resources and Energy Management Divisions form the Energy Branch also under the direction of an Assistant Deputy Minister (ADM). The two ADMs and the Director of the Administration Division report to the Deputy Minister. The organization of the Department, as of 31 March 1984, is shown in Figure 1.

RESPONSIBILITIES

Mineral Resources Division: responsible for the assessment of the Province's mineral potential.

- investigates and publicizes the geology and mineral occurrences of the Province through its own scientific programs and through analyses of private sector exploration activities
- provides nontechnical information through maps, brochures, pamphlets, and talks, about the geology and mineral resources, exploration, and mining in Nova Scotia.

Mining Engineering Division: responsible for ensuring that Nova Scotia mines are developed according to current safety, environmental, and mining practices and regulations.

- conducts engineering studies
- approves mining plans
- conducts mine inspections and maintains mine rescue stations
- trains personnel in mine rescue and first aid.

Mineral Development Division: responsible for issues involving the exploration and utilization of the Province's mineral resources.

- maintains a mineral and petroleum titles registry
- assists development of mineral resources
- operates a library in Halifax and in Stellarton
- maintains a core library and repository in several areas of the Province
- monitors exploration work

Energy Resources Division: responsible for the development of the Province's indigenous energy resources: peat, coal, petroleum, and natural gas.

- monitors and regulates all petroleum exploration and development
- undertakes coal and peat exploration programs
- promotes energy resource development.

Energy Management Division: responsible for issues involving the supply of energy from outside the Province and the demand for and utilization of energy within the Province.

- develops economic analyses and statistics on energy matters
- provides engineering services related to energy use
- develops and administers energy conservation programs
- provides public information about energy.

Administration Division: responsibile for providing financial and other support services to the divisions of the Department.

- provides accounting, mineral taxation, legal, and personnel services
- administers coal mine/miner financial aid programs
- provides cartographic and photographic services
- provides accounting services for Novaco Ltd.

CHANGES IN ORGANIZATION

During the 1983 - 84 fiscal year the Department received approval from Cabinet to fill the position of Assistant Deputy Minister, Energy. The Honourable Ron Barkhouse appointed Mr. R. Hornby as Assistant Deputy Minister, Energy. Following the resignation of Mr. J. French to join Nova Scotia Resources Ltd., the Minister of Mines and Energy appointed Mr. C. Ryan to the position of Director, Energy Management Division.

During the fiscal year a new minister was named. The Honourable Joel R. Matheson, Q.C. assumed the Mines and Energy portfolio from the Honourable Ron Barkhouse.

PERSONNEL

The Department has 160 employees. Most work in Halifax and Stellarton. Offices are maintained in Glace Bay and Springhill.

OFFICES OF THE DEPARTMENT

The Department of Mines and Energy maintains four offices in the Province at Halifax (headquarters), Stellarton, Glace Bay, and Springhill. The addresses, phone numbers, and functions they perform follow.

Halifax
Joseph Howe Building
1690 Hollis Street — all Divisions and functions
424-5346 — MINES AND MINERALS BRANCH
424-4700 — Mineral Resources Division
424-5467 — Mining Engineering Division
424-4162 — Mineral Development Division

424-5351 — ENERGY BRANCH
424-5933 — Energy Resources Division
424-5019 — Energy Management Division

424-4629 — Administration Division

Stellarton
32 Bridge Avenue — Mineral Development Division
752-8430 — (resource geology, exploration monitoring, core library)
Energy Resources Division
(coal exploration)
Engineering Division
(drilling, maintenance work; mine inspection)

Glace Bay
Chernin Building — Engineering Division
10 Commercial Street — (first aid, mine inspection)
849-7500

Springhill
29 Main Street — Engineering Division
597-3963 — (mine inspection)

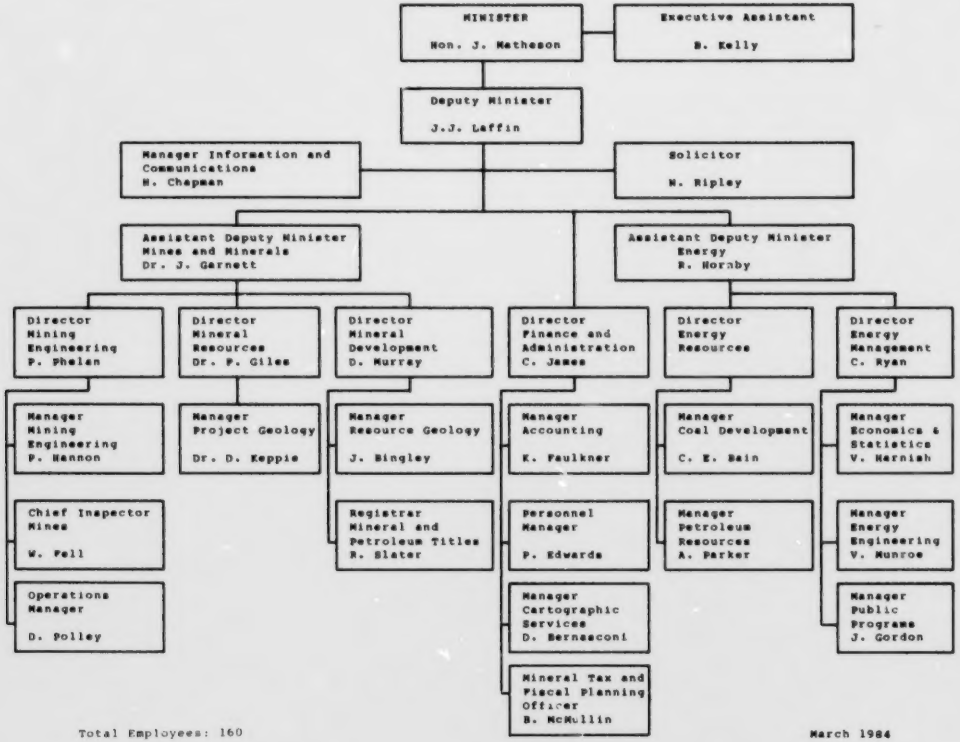

Figure 1. Organization of the Department of Mines and Energy

MINES AND MINERALS BRANCH

J.A. Garnett, Ph.D., P.Eng., Assistant Deputy Minister

The Mines and Minerals Branch has a mandate to promote the understanding of the geology and mineral resources of the Province, the exploration for and development of mineral deposits, and the safe and environmentally acceptable mining practices.

Three divisions report to the Assistant Deputy Minister for Mines and Minerals. The Mineral Resources Division explores, assesses, and publicizes the Province's mineral wealth. The Mining Engineering Division ensures that mines in Nova Scotia are developed according to current safety, environmental, and mining practices and regulations. The Mineral Development Division promotes the exploration and utlization of the Province's mineral resources.

MINERAL RESOURCES DIVISION

P.S. Giles, Ph.D., Director

Geological investigations undertaken by the Division provide improved understanding of the geology of Nova Scotia and of the Province's mineral potential. Information gained through divisional research and supplemented through analyses of private sector activities is made available through publication of maps and reports. The publications and geological work of the Division are directed toward the optimal utilization of the Province's mineral resources.

The Canada/Nova Scotia Co-operative Mineral Agreement 1981 - 84 continued to provide supplementary funding resulting in expanded activity for the Mineral Resources Division. The same Agreement also allowed significant complementary research efforts by the Geological Survey of Canada in Nova Scotia. This co-operative effort has contributed substantially to advances in geology, geochemistry, geophysics, and to the achievement of a better understanding of mineral deposits and factors governing their distribution.

Project Geology Section

J.D. Keppie, Ph.D., Manager

INTRODUCTION

All divisional programs in 1983 were carried out by the Project Geology Section with a staff of thirteen professional geologists, several of whom were retained on contract to assist in projects of the Co-operative Mineral Agreement. Activities of the Project Geology Section can be broadly summarized as information-gathering through projects and programs, dissemination of this information through formal publications and professional lectures, and the development of public awareness and appreciation of the Province's mineral industry through non-technical promotional and educational programs.

PROJECTS

Projects were distributed throughout the Province (Fig. 2) and ranged considerably in scope and character. These activities collectively provide geological information widely used by exploration companies, government and private land use planning groups, environmental groups, and various federal and provincial agencies.

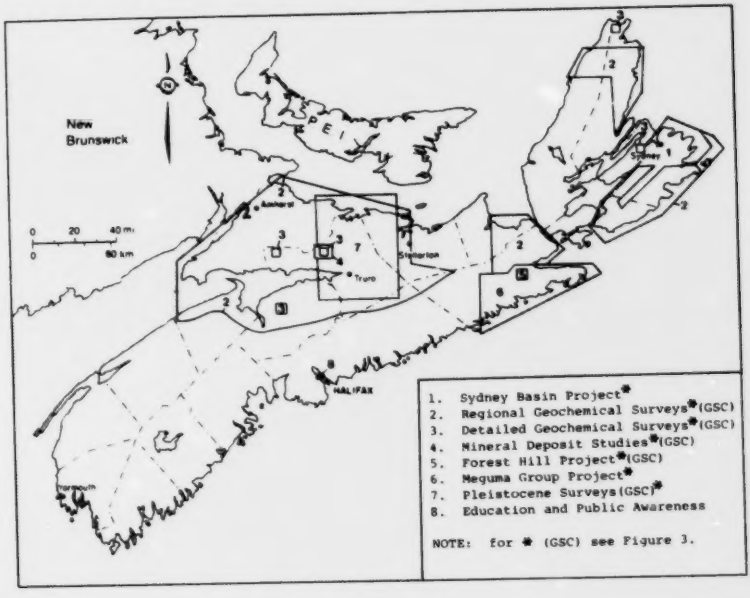

Figure 2. Project locations for the Mineral Resources Division

Geochemical Surveys

A regional geochemical sampling program was completed for northern Nova Scotia in 1983, with 4100 stream sediment, 350 lake sediment and approximately 4500 water samples collected in an area of 4000 square miles. These regional surveys, jointly funded under the Co-operative Mineral Agreement, assist industry in defining exploration targets and in delineating areas of anomalous metal concentrations. More detailed surveys were conducted in the vicinity of known mineral deposits in order to demonstrate their geochemical expression and to test various methods of geochemical exploration.

Surficial Mapping and Till Geochemistry

Much of Nova Scotia is blanketed by glacial deposits which hide the underlying bedrock and hamper mineral exploration. Through detailed study of these surficial materials and their geochemistry, it is possible to more thoroughly test the mineral potential of the bedrock in drift-covered areas.

In 1983 detailed mapping studies were continued in areas of Cumberland, Colchester, Hants and Pictou Counties. This regional project was jointly funded by the Canada - Nova Scotia Co-operative Mineral Agreement 1981 - 84.

Detailed study of Pleistocene till and till geochemistry was undertaken in an area of known gold mineralization at Forest Hill, Guysborough County, in order to assess the relationship of Pleistocene geology to bedrock gold mineralization. Departmental geologists designed and supervised this project which was funded by the Geological Survey of Canada.

Sedimentary Basin Studies

During the 1983 field season geologists from the Division completed detailed studies and geological mapping of Carboniferous aged sedimentary rocks in the Sydney Basin and contiguous areas of south-eastern Cape Breton Island. With known deposits of coal, lead-zinc, barite and celestite, and potential for similar deposits as well as salt and potash, this study has the potential for short-term impacts in mineral resource assessment. Project research involved not only departmental staff, but also geologists from Dalhousie and Acadia Universities, the University of Ottawa, and the Geological Survey of Canada.

Meguma Group Project

Sedimentary rocks of the Meguma Group, with associated intrusive and metamorphic rocks, have been the recent focus of exploration activity for gold. The 1983 field season completed detailed studies in large areas of Halifax and Guysborough Counties. Geologists from the Department, the Geological Survey of Canada, Dalhousie and St. Mary's Universities attempted to develop geological concepts explaining the distribution and localization of gold mineralization. This multi-disciplinary study formed a timely addition to private sector gold developments in the Guysborough County area.

Mineral Deposits Studies

Fundamental to the search for new mineral deposits is a thorough understanding of known deposits and factors controlling their origin and localization. This on-going activity continued in all project areas, with more specific focus on mineralization in part of the Cobequid Highlands in 1983. In a project jointly funded under the Co-operative Mineral Agreement, uranium, tin and silver mineralization hosted by volcanic and sedimentary rocks were carefully documented. Mineralization of this type had not been previously recognized in Nova Scotia, permitting the project to provide direct stimulus

to mineral exploration.

Federal Projects

Staff of the Project Geology Section maintained close liaison with several projects undertaken in Nova Scotia in 1983 by the Geological Survey of Canada. Among these projects were regional mapping of parts of the Antigonish Highlands and the Cumberland Basin, as well as research on Meguma Group gold deposits by federal personnel. Projects were also undertaken in Shelburne County (geological mapping) and in Lunenburg County (airborne magnetic geophysical survey) as part of the Co-operative Mineral Agreement.

EDUCATION AND PUBLIC AWARENESS

The purpose of the Education and Public Awareness Program is to develop educational information about the geology, mineral resources, mining history of the provincial and geological projects of the Mines and Minerals Branch. Displays, various publications, the annual Open House and the Prospecting Course are ways of meeting this goal.

Prospecting Course

In cooperation with the Chamber of Mineral Resources of Nova Scotia, the Department has helped sponsor a course entitled *Prospecting and Geology in Nova Scotia*. The first offering of this course was in the spring of 1982 and during 1983 the course was offered in February. A total of 27 people have taken the course.

The prospecting course was held at Dalhousie University. It consisted of one class per week for eight weeks and two field trips. The topics covered were: identification of common rocks and minerals, use of maps and airphotos, methods of prospecting, preparation of geological maps, and role of the Department in mineral exploration.

Displays

The Education and Public Awareness Program is responsible for the displays pertaining to mineral resources of the Province and the projects of the Mines and Minerals Branch. Two major displays were prepared for the annual Prospectors and Developers Association (PDA) meeting in Toronto. One described the geology, areas held under mineral exploration licence, and producing mines and quarries. The other showed the results of three

geological projects funded through the Co-operative Mineral Agreement. The display described salt, potash, and gypsum/anhydrite exploration in the Province; tin, tungsten, and associated minerals from the granite regions of southern Nova Scotia; and the gold occurrences in the Country Harbour region of Guysborough County. Over 4000 people were present at the PDA meeting.

Open House.

Each year the Department hosts an Open House and Review of Activities. The event was held on November 30 and December 1, 1983, and was attended by over 300 geologists and interested people. A special symposium on gold research drew a large audience. The research described during the symposium was funded under the Co-operative Mineral Agreement.

PUBLICATIONS

Detailed technical publications are the principal means of communicating information about the geology and mineral resources of Nova Scotia. The technical reports are published either as part of the Department's publication series or in scientific journals. In addition, Division staff give lectures and talks at scientific meetings, local universities, schools, and community or school groups.

Relevant short technical reports for each of the projects appear in the annual Mines and Minerals Branch Report of Activities. A list of publications by the geologists of the Section, as well as other departmental publications, appears in Appendix A.

MINING ENGINEERING DIVISION

P.W. Phelan, P.Eng., Director

INTRODUCTION

The Mining Engineering Division is responsible for the administration and regulation of the mining industry in the Province on behalf of the Department of Mines and Energy. These functions include the approval of new mining projects or modifications to existing projects, responsibility for occupational health and safety of workers, protection of the environment, and efficient use of the Province's resources. The Division provides a diamond drilling service to the Mineral Resources and Energy Resources Divisions of the Department and to other government departments. The Division is responsible for maintaining the equipment and facilities needed for drilling activities and maintenance services for departmental vehicles.

SIGNIFICANT EVENTS IN 1983–84

Canada Cement Lafarge Ltd. have opened a small gypsum quarry near the plant at Brookfield. The production is solely for the company's internal requirements.

Rio Algom Limited are doing additional drilling, metallurgical and engineering studies of the East Kemptville tin deposit in Yarmouth County.

Georgia Pacific Ltd. are at the preliminary stages of the long-term plan to move their mining operation from the present site at River Denys to a new site near Sugar Camp Lake, Inverness County.

The surface coal mine operated by Novaco on the Rodney seam in Springhill, Cumberland County, that commenced operation in 1982, ceased production in June 1983 when the surface coal reserves were exhausted. Proposals have been solicited from private industry to develop an underground coal mine from the high wall of the pit.

There were no fatal accidents in the mines and quarries of Nova Scotia during fiscal year 1983 - 84.

MINING EXAMINATIONS

Board of Examiners

Under the Coal Mines Regulation Act positions in underground operations

must be filled by individuals who have an appropriate "Certificate of Competency". A Board of Examiners is responsible for overseeing the examinations and issuing the certificates.

The Board consists of five members appointed by the Minister of Mines and Energy:

A. MacKenzie, P.Eng., Glace Bay
H. Slaunwhite, P.Eng., Sydney
J. Reid, P.Eng., Sydney
K. MacLeod, P.Eng., Sydney
P. Phelan, P.Eng., Halifax
(Secretary to the Board)

Certificates of Competency

Training and examinations for seven categories were held at the University College of Cape Breton. The categories were: Mine Supervisor; Mine Examiner; Mine Electrician, First and Second Class; Mine Mechanic, First and Second Class; and Hoist Operator. Examinations were also held for the certificate of competency as Mine Manager and Underground Mine Manager.

Each year the Mining Society of Nova Scotia awards a prize for the highest grade in examinations for Mine Manager, Underground Mine Manager, and Mine Supervisor. This year (1983) the awards were made in three categories:

Manager — Thomas Lamb
Underground Manager — Carl Hillier
Mine Supervisor — Dennis Kelly

The results of the examinations are shown in Tables 1 and 2.

TABLE 1. Examination Results for Certification Under the Coal Mines Regulation Act

Category	Passed	Failed	Total
Manager	3	2	5
Underground Manager	3	0	3
Supervisor	17	1	18
Mine Examiner	19	0	19
Hoist Operator	4	0	4
Mine Electrician, 1st Class	8	3	11
Mine Electrician, 2nd Class	17	0	17
Mine Mechanic, 1st Class	12	0	12
Mine Mechanic, 2nd Class	15	0	15
TOTAL	98	6	104

TABLE 2. Summary of Other Certificates Issued by the Board of Examiners

Category	Number
First Class Coal Miner	81

Mining Engineering Section

P.J. Hannon, P.Eng., Manager

The Mining Engineering Section is responsible for ensuring that the Province's mineral and energy resources are utilized to their optimum, and that mining operations are conducted in a safe, efficient, and environmentally acceptable manner. This includes reviewing proposals from industry for new mining projects or modifications to existing mines, and making recommendations for the issuing of mining leases and permits. The Section also provides technical advice and assistance to industry and government on complex mining problems, and conducts economic and feasibility studies for new mineral projects.

Mine Inspection Section

W.J. Fell, P.Eng., Chief Inspector

The Inspection Section is responsible for inspecting mines and quarries to ensure the health and safety of employees in the mineral industry. Routine mine inspections are conducted under authority of the Coal Mines Regulation Act and the Metalliferous Mines and Quarries Regulation Act in all mines and quarries within the Province, except for the coal mines of the Cape Breton Development Corporation (CBDC) which are inspected by Labour Canada. The mine rescue stations of CBDC are inspected by the Department and the Board of Examiners certifies workers for CBDC. The Inspection Section has a staff of eight working from regional offices in Stellarton, Glace Bay, and Springhill. The number and types of inspections conducted during the fiscal year are shown in Table 3.

TABLE 3. Inspection Statistics for the Fiscal Year

Category	Number
Total Inspections	610
Mine Rescue Classes Conducted	43
Mine Rescue Station Inspections	56
Fatalities	0
Unusual Occurrences	7
Illegal Mines Closed	3

MINE RESCUE

The Mine Rescue Program is designed so that sufficient fully-trained mine rescue teams are available for an emergency at any mine in the Province. Mine rescue stations are located at most mines. A central mine rescue station operated by the Department is located at Stellarton. Two inspector/instructors are employed by the Department. Monthly training sessions are conducted at all underground mines in the Province. Mine rescue instructors conducted classes in mine rescue procedure at the University College of Cape Breton in Sydney and at the Technical University of Nova Scotia in Halifax.

FIRST AID

First Aid instruction is given at all mine sites. Inspections are made of the first aid facilities and programs at these mines. Thirty-nine candidates were successfully certified in the St. John Ambulance emergency first aid course administered by the Department.

Drill and Mechanical Section

D. Polley, Manager

The Drill and Mechanical Section is responsible for operating the Department's diamond drills and maintaining all mechanical equipment and vehicles.

The amount of drilling performed by the Section declined by 10% in 1983 (Table 4). The drilling was conducted on five projects for the Mineral Resources, Mineral Development, and Energy Resources Divisions.

Coal reserves in Pictou County, the Springhill area, and the Glace Bay area were investigated by drilling under the direction of the Energy Resources Division. Deposits of silica sand were drilled at Musquodoboit, Upper Stewiacke, and in Cape Breton at Iron Mines and Blue Mills. Drilling was used to confirm the stratigraphy of rocks at Glen Road, Antigonish County and Point Edward in Cape Breton as part of the Carboniferous Basic Studies. At Wine Harbour, Guysborough County the nature of gold mineralization was investigated by drilling. Various mineral deposits in Antigonish County were also tested using the Department's drills.

TABLE 4. Annual Drilling Statistics

Year	No. of Holes	Amount Drilled	
		Feet	Metres
1980 (calendar year)	142	28 070	8 506
1981 (calendar year)	161	24 763	7 511
1982 - 83 (fiscal year)	84	22 189	6 724
1983 - 84 (fiscal year)	76	19 862	6 054

MINERAL DEVELOPMENT DIVISION

D.A. Murray, M.Sc., Director

The Mineral Development Division is divided into two sections, the Resource Geology Section and the Mineral and Petroleum Titles Section. The responsibilities of the Division lie in the orderly development and promotion of the Province's mineral resources. Included in these responsibilities are mineral resource regulations, mineral titles policies, and assistance in the promotion and development of barite, agricultural limestone, tin and gold. The Division provides assistance to the industrial mineral producers and potential producers in establishing new reserves. It also maintains geological information through the departmental libraries and drill core library, monitors exploration activity in the Province, provides a liaison between the exploration industry and private landowners and government agencies, and collects and compiles mineral production and exploration statistics. The Division is also responsible for the maintenance of geological, surveying and camping equipment for the Department, and helps set up all geological field camps.

During 1983 policies were developed regarding:

- the exploration and development of minerals in abandoned tailings and waste rock
- the exploration on watershed areas and
- the extraction of bulk samples greater than 110 tons (100 t).

Revision of the Mineral Resources Act is planned for 1985. Meetings have been held throughout 1983 with the Chamber of Mineral Resources of Nova Scotia regarding policy changes within the Act. The proposed legislation will encourage exploration and provide for the proper management of the mineral resources.

The location of projects is shown on Figure 3.

Resource Geology Section

J.M. Bingley, B.Sc., Manager

INTRODUCTION

The Resource Geology Section performs six distinct functions that are all related to provision of geological services and/or geological information to the exploration industry, government agencies and the public.

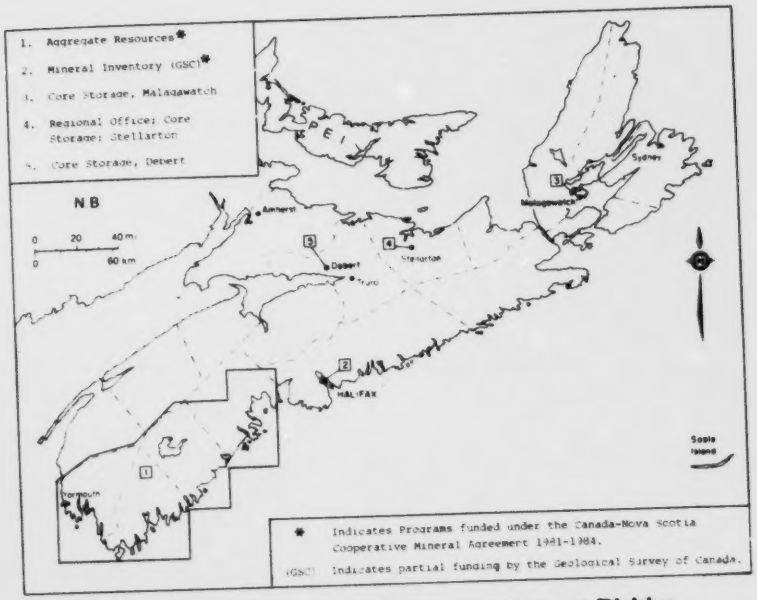

Figure 3. Project locations for the Mineral Development Division

Activities at the two offices fall under the headings listed below:

Halifax Office	Stellarton Office
Industrial Minerals	Drill Core Library
Library Services	Exploration Monitoring
Mineral Inventory	Surveying

MINERAL INVENTORY

The Mineral Inventory Group collects, verifies, organizes, and disseminates mineral resources information. Exploration assessment reports are examined for complience with the Rules and Regulations of the Mineral Resources Act. The Mineral Inventory Group establishes and maintains databases of mineral resources information and publishes reports and pamphlets about the databases.

Canada–Nova Scotia Cooperative Mineral Agreement 1981–84 (CNSCMA). As a result of funding obtained under the CNSCMA from the Energy,

Mines and Resources Canada and the Nova Scotia Department of Mines and Energy, three projects initiated in fiscal year 1982 - 83 came to completion at the end of fiscal year 1983 - 84. The three projects were: the GEOSCAN Geoscience Theses and Journal Literature Project; the Metallic Mineral Occurrence Updating Project; and the Drillhole Database Project.

GEOSCAN Geoscience Theses and Journal Literature Project. To date, 499 B.Sc., M.Sc. and Ph.D. geoscience theses on Nova Scotia have been identified, fully indexed and entered into the GEOSCAN database. Of these theses, 430 are available for consultation on microfiche in the departmental library in Halifax. A Thesis Study Area Location Map has been prepared showing the location(s) of each individual thesis study area in Nova Scotia. In addition to the theses, 969 geoscience journal literature references on Nova Scotia have been partially indexed and entered into the GEOSCAN database.

Metallic Mineral Occurrence Updating Project. The existing 800 metallic mineral occurrences data cards were all checked and updated with additional or new information from NSDME assessment reports, publications and open file reports covering the years 1978, 1979 and 1980. In total, 429 updates were recorded and 12 new metallic mineral occurrence data cards were created.

Drillhole Database Project. A database on drilling in Nova Scotia was established using data on drilling extracted from mineral exploration assessment reports available up to 1980. Drilling data are recorded under 28 different data fields, and output can be produced as tabular listings of selected drillhole data fields by map sheet, and as drillhole location map plots. To date, 8,542 drillholes, from 594 assessment reports, have been entered into the database, covering map sheets 11D, 11E, 11F, 11G, 11J, 11K, 11N, 20O, 20P and 21A.

GEOSCAN Bibliographic Activities

Indexing and on-line data entry of Nova Scotia geoscience information into GEOSCAN, the national bibliographic database for geological information, continued throughout fiscal year 1983 - 84. To date, GEOSCAN contains 6,540 NSDME records, namely: 3,156 assessment reports; 1,386 publications; 969 journal literature references; 518 open file reports; 499 theses; and 12 open file maps.

Index to Geoscience Maps of Nova Scotia. This index is being prepared and when available it will list all the known geoscience maps on Nova Scotia, or-

ganized on the basis of 1:50 000 NTS map sheets. Within any one NTS map sheet the map information will be listed under five data fields: general map types; specific map type; map scale; year of publication; and source of map.

Index to Gold Information on Nova Scotia. A bibliographic index to information on gold in Nova Scotia is being prepared. The index will consist of two sections, a complete alphabetic listing by author of all the compiled references and a listing of reference and maps for each individual gold district.

Mineral Occurrences Database

Information on the metallic and industrial mineral occurrences data cards (approximately 1600 occurrences) is being computerized. When developed, the mineral occurrences database will provide tabular listings of mineral occurrence data from selected data fields by map sheet, or location plots of individual mineral occurrences by map sheet.

LIBRARY SERVICES

The Department maintains two libraries: a main library in the Halifax office and a branch library in the Stellarton office. Over 3000 maps, 2500 exploration assessment reports, 500 open file reports, 450 theses, 200 different periodicals, journals and trade magazines, and numerous reference texts, and other document types are held in the libraries. The libraries function as important resource centres for information on the geology, energy resources, and mining history of Nova Scotia. To this end, the libraries provide the following services and facilities:

- reference and information service to the general public, provincial government personnel, professional geoscientists, engineers, and consultants in private industry
- sale of departmental and selected Geological Survey of Canada publications and maps
- catalogued and classified files of the library holdings, including exploration assessment reports, open file reports and theses
- a mailing list of individuals, institutions, and corporations that wish to be informed of our activities and publication releases
- facilities for photocopying, microfiche reading and printing, and for making white print duplicates of maps.

During fiscal year 1983 - 84, 1633 map white prints, 4679 photocopies and 6388 microfiche prints were made; 2260 publications and 2097 maps were sold; 863 mail requests were filled; 541 interlibrary loans were processed; 478 documents were catalogued; 177 supply orders were placed; 14

new publications announcements were released; and 1456 library services slips were filled out. More than 850 people made use of the library facilities, excluding departmental staff. Revenue generated by the Library during this period was $24,047, comprising $17,336 from the sales of maps, white prints, photocopies and microfiche prints, and $6711 from the sales of publications.

Documents Available

The following documents became available during fiscal year 1983 - 84:

Assessment Reports	180
Open File Reports	46
Open File Maps	5
Publications	11
Published Maps	6

STELLARTON REGIONAL OFFICE

The Resource Geology Section's Stellarton component includes mineral exploration industry liaison and monitoring, drill-core library and other geotechnical sample storage, technical records library, in-house technical support services, and sales and distribution of maps and publications.

Drill Core Library

The provincial diamond-drill core library is supervised by the Regional Geologist, Stellarton. Core is maintained either on racks or on pallets, at facilities at the regional office in Stellarton, at Debert Industrial Park, at Malagawatch, Inverness County, and at new facilities in the Industrial Park in Stellarton.

The combined total capacity for all locations is approximately 1,640,400 feet (500 000 m), with nearly 1,148,280 feet (350 000 m) in storage at the end of the fiscal year. Approximately 295,272 feet (90 000 m) of core were obtained during the year from previous and current drilling programs conducted by the mining industry and by the department.

The major new storage facilities in the Stellarton Industrial Park came into use during 1983. These consist of three 8,000 square feet (720 m^2) arch rib buildings in a fenced compound. One of the buildings contains a 30×40 foot (9.2×12.3 m) heated examination laboratory containing core layout benches, trim saws, a sink, a small office and toilet facilities. This building has a capacity of 360,888 feet (110 000 m) of BQ core stored on pallets, and the other buildings each has a capacity for approximately 492,120 feet (150

000 m) of BQ core on pallets. Pallet loads of core are moved to and from the examination area by fork lift truck.

Exploration Monitoring and Liaison

Two geologists at Stellarton liaise with personnel of the mineral exploration industry, and monitor current exploration activity. The liaison allows them to provide information to the government and to provide advice and assistance to exploration geologists in the field.

The monitoring process includes visits to exploration sites, reviews of assessment reports submitted by industry, and an annual survey of all exploration companies. The survey identifies costs and the types of work done. The data are compiled, tabulated, and summarized on an annual basis in order to identify long-term trends and to determine the general health of the exploration industry in the Province.

Most of the data collected about exploration activity is summarized in the Mines and Minerals Branch Report of Activities.

Technical Records Library

The Stellarton library contains departmental and Geological Survey of Canada publications, geological, aeromagnetic and topographic maps, geological theses, assessment reports (paper copies and microfiche), open file reports, mineral occurrence data cards (M.O.D.), monthly and weekly geological and mining magazines and a variety of other publications and unpublished material. Departmental publications, aeromagnetic maps, geological maps and topographic maps are for sale to the public.

Technical Support Services

Two mineral technicians and a surveyor provide assistance to departmental staff. Such services and assistance include pick-up and delivery of equipment, samples, drill core, etc., preparation of and attendance at rock and mineral displays at public functions, setting-up and maintenance of field camps, preparation of samples, and surveying. All holes drilled by the Drilling Section are surveyed for location and elevation and many of them are also surveyed for down-hole direction and deviation. Surveys of pits, quarries, waste-dumps and tailings are also part of the work.

INDUSTRIAL MINERALS

Departmental Activities

The industrial minerals geologist is responsible for maintaining a liaison between the industry and government. He provides technical and geological information to industry and conducts geological research programs.

Along with the usual duties of the industrial minerals geologist the following projects were undertaken.

Aggregate resource studies were completed for Cape Breton Island and southwestern Nova Scotia with final reports nearing completion.

A gypsum deposit study for the province was started under the student summer works program.

A two-part program consisting of a refraction seismic survey and diamond drilling to locate Cretaceous silica sand and clay deposits was completed. Several interesting profiles were produced, many of which were drilled with the results of the program presently being evaluated. A report on the Cretaceous deposits of the Province is in progress.

A new edition of the provincial industrial mineral map at a scale of 1:500,000 is in progress with publication slated for 1984.

PRIVATE SECTOR EXPLORATION AND DEVELOPMENT

Industrial Minerals and Aggregates

Nova Scotia has been mining and exporting industrial minerals for over two hundred years. As an industrial mineral producer, this Province continues to rank as the major gypsum mining and exporting region of North America. In 1983, excluding aggregate companies, there were 21 industrial mineral producers operating at 32 sites producing ten commodities. These are anhydrite, barite, clay and shale, dolomite, gypsum, limestone, salt, silica sand, stone, and peat moss. Numerous aggregate producing operations supply all the Province's requirements and export some of these materials to other markets in Eastern Canada, the United States, and Bermuda.

Production value of industrial mineral commodities for 1983 was $123 million representing a 17% increase over the previous year. Because of the general improvement in the economy indications are that the 1984 value of production will be higher.

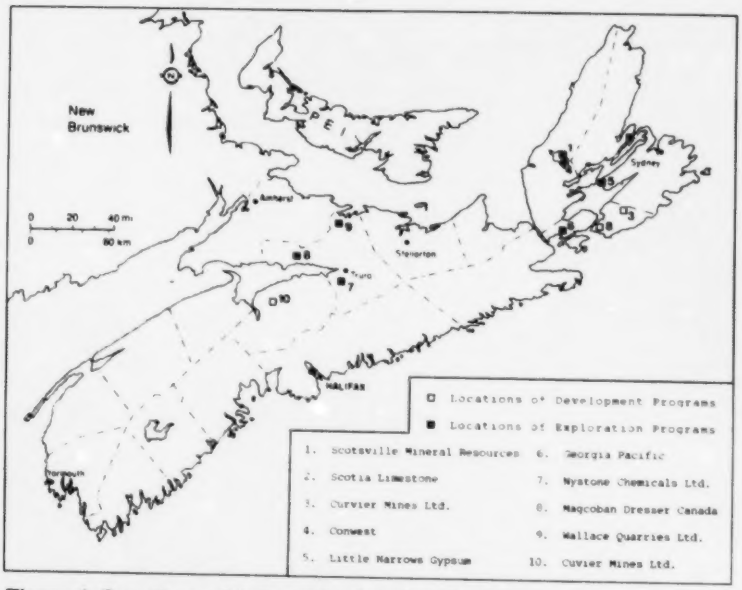

Figure 4. Locations of industrial mineral exploration and development programs

In 1983 research programs, market studies, exploration and development programs, and plant upgrading programs were active relative to the following commodities: aggregates, barite, dolomite, gypsum, limestone, building stone and salt. The location of exploration programs is shown on Figure 4.

Aggregates. Reported aggregate production in 1983 amounted to 11.5 million tons (10.4 million) valued at $44 million. Seventy per cent of this production came from the numerous granular deposits scattered throughout the Province with the remaining 30 per cent produced by several bedrock aggregate quarries most active in the Halifax-Dartmouth area.

Since 1975 rising aggregate production can be attributed to an increase in building construction in the larger centres, upgrading the provincial highway system, the development of an export market and the use of selected aggregate materials to manufacture precast exposed aggregate building panels.

Barite. Nystone Chemicals continued operating their quarry at Brookfield and their plant at Debert. Along with their established pharmaceutical barite production, Nystone began the production of drilling mud grade barite.

In northern Nova Scotia, Magcobar Division, Dresser Canada Inc. operated a small quarry at Upper Bass River, Colchester County, which produced drill mud grade barite. The ore was shipped to Walton, Hants County for final grinding.

At Scotsville, Inverness County, Scotsville Mineral Resources completed a diamond drilling program and a mine feasibility study on the MacInnis barite deposit. Present plans are to mine, crush and jig concentrate the ore at the site and ship the concentrate elsewhere for grinding and subsequent use as drill mud barite.

Conwest, owners of the barite-fluorite deposits at Trout River, Inverness County continued work on market and mine feasibility studies on one of their larger deposits.

At Walton, Hants County, Magcobar Dresser Canada has completed an evaluation program of barite reclamation from the Walton mine waste dumps. Magcobar has been issued a Special Mining Lease to proceed with this program.

Diatomite. In 1983 there was a renewed interest in the Province's diatomite (diatomaceous earth) deposits. Numerous occurrences are known in the Cobequid Highlands region of northern Nova Scotia and along the North Mountain region of Annapolis and Digby Counties. Although no production ensued, deposits in the New Annan district of Colchester County were sampled and assayed for use as a filler and as a pozzolan (a cement additive).

Dolomite. Mosher Limestone who currently operate an agricultural lime quarry and plant at Upper Musquodoboit, Halifax County, continued development work on a dolomite deposit for agriculture purposes at Cooks Brook, Halifax County.

Gypsum and Anhydrite. Along with the increase in production for the year, work began on the development of new reserves by three companies and the marketing of a new gypsum product by another producer. At Sugar Camp, Inverness County (7 miles north of Port Hawkesbury) Georgia Pacific began development on a new gypsum property. At Little Narrows, Victoria County, Little Narrows Gypsum continued their program to develop a new deposit to the northeast of the present quarry.

At Brookfield, Colchester County, Maritime Cement, the Province's only cement manufacturer, opened a small gypsum quarry at Upper Brookfield for their own requirements as a retarding agent in portland cement.

At Windsor, Hants County, Domtar, which operates the only gypsum processing plant in the Province, began manufacturing gyp-crete, a gypsum-cement product used mostly for flooring in large commercial buildings.

Limestone. In late 1983 Maritime Cement undertook an oilwell cement manufacturing trial run at the Brookfield plant.

Ocean/Ways Minerals Development Corp. is examining the possibilities of utilizing the large limestone deposit at Glencoe, Inverness County for cement manufacture.

At the Point Tupper, Richmond County thermal power generating station, the Nova Scotia Power Corporation, Energy Mines and Resources Canada, and the National Energy Program are involved with a fluidized bed combustion study utilizing limestone from Scotia Limestone's Irish Cove deposit as the sorbent material.

Salt and Potash. Salt, produced by The Canadian Salt Co. Ltd. at Pugwash and Sifto Salt at Nappan, Cumberland County, has been experiencing a production drop in recent years. This is attributed to competition from new production in other Eastern Canadian provinces, imports of Spanish solar salt used primarily in the fishery, and a change in user specifications.

Noranda Exploration continues to hold their special licence for potash exploration in the Ashfield, Inverness County area. Dow Chemical holds salt and potash development licences at Lower River Inhabitants and Port Richmond, Richmond County. Dow also holds an underground gas storage licence in the same area. Domtar continues to hold their salt development licence at Kingsville, Inverness County.

Gulf Canada Ltd. was issued a salt and potash exploration licence and an underground gas storage permit in the McIntyre Lake area of Inverness County.

Silica Sand. Nova Scotia Sand and Gravel is Nova Scotia's only silica sand producer. Until last year this company supplied industrial sand to Atlantic Canadian markets and silica sand to a glass container manufacturing firm and a fiberglass insulation plant in the Moncton, New Brunswick area. The closure of the insulation manufacturing plant and the loss of the glass container company market has reduced annual production from 30,000 to 40,000 tons (27 200 – 36 300 t) to 16,500 tons (149 900 t), however, the company is optimistic that new markets will be developed in 1984.

Stone. In 1983, 6,000 cubic feet (180 m³) of stone were quarried in Nova Scotia by Heritage Memorials at Nictaux, Annapolis County. This stone was used to manufacture memorial headstones at their Windsor, Nova Scotia plant.

Throughout the year, interest in building stone increased for use in new building projects and in the possibility of obtaining stone from defunct quarries. In response to several inquiries into the availability of sandstone for restoration work in the Halifax area and Northeastern United States as well as the possibility of using sandstone for a new museum in Ottawa, a feasibility study for reopening the Wallace quarry was commissioned by the company, Wallace Quarries Ltd.

Base Metals and Gold

The level of mineral exploration during the past year has shown an improvement over the previous twelve month period. Gold, tin, and tungsten have again been the prime targets for exploration. Exploration for the common base metals (copper, lead, and zinc) has generated some activity, generally to a similar extent as the previous year. See Figure 5 for locations.

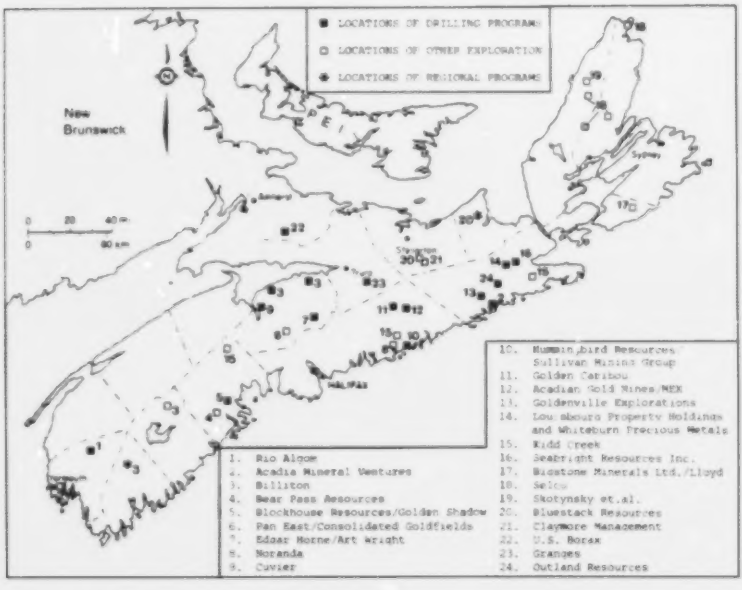

Figure 5. Locations of gold/base metal exploration programs

Staking was moderately active (Table 5) throughout the year with Billiton Canada Ltd. and Seabright Resources Inc. being the largest claims holders. Chevron Canada Resources Ltd., Dome Exploration Ltd. and Amax of Canada Ltd. were no longer active in the Province, but several newcomers started exploration programs or opened new offices. These newcomers included a group based in Vancouver (Outland Resources, Bear Pass Resources, and Acadian Gold Mines) and a group based in Toronto (Golden Shadow, Golden Caribou Explorations, Lake Mine Resources, and Isaacs Harbour Gold Resources), both of which were looking primarily for gold. In addition Granges Exploration AB has been drilling the Smithfield base metal deposit during the past two years and has recently opened an office in the Halifax area.

A group headed by Doug Hunter and Lloyd Nelson (Bigstone Minerals Ltd./Lloydex) is in the initial stages of a new program to re-evaluate the old Stirling mine property.

Gold. Drilling was carried out this year in Guysborough County by Seabright Resources Ltd. at Forest Hill (Fig. 5), the Riddell group at Mile Lake, Acadia Mineral Ventures at Wine Harbour, Goldenville Explorations at Goldenville, and Outland Resources at Widow Point, Country Harbour. In Halifax County, Sullivan Mining Group drilled at Tangier and Acadian Gold Mines and M.E.X. Exploration Ltd. drilled Beaver Dam.

In Blockhouse, Lunenburg County, drilling was carried out by Golden Shadow and further drilling was done by Art Wright at Renfrew, Hants County. U.S. Borax drilled near Williamsdale, Cumberland County.

Other exploration consisted of gradiometer surveys (Seabright at Forest Hill, Goldenville at Goldenville), basal till/bedrock sampling (Riddell at Mile Lake, Outland at Widow Point), and rock trenching (Seabright at Forest Hill, Pan East/Consolidated Gold fields at Mt. Uniacke, Hants County). Golden Caribou rehabilitated and dewatered the Holman Shaft at Caribou, Halifax County, in preparation for underground sampling and drilling. Seabright Resources Ltd. continued studying the feasibility of gold recovery from old tailings sites around the Province. Northumberland Mines evaluated a leaching process for the Cochrane Hill Mine, Guysborough County. Outland Resources set up a mobile test mill at Widow Point and ran some bulk samples.

Geochemical and geophysical surveys, mapping, and prospecting were carried out in many parts of the Province, particularly in the old gold districts of the Meguma Group.

Base Metals. Due to weak world markets for base metals, exploration activity remained low in the Province during 1983 - 84. Selco Inc. was active in the Cape Breton Highlands and the Bluestack Resources/Selco joint venture continued geochemical exploration for base metals and barite in Pictou and Antigonish Counties. Re-evaluation of the old Stirling Mine area by the Bigstone/Lloydex consortium was begun. Selco explored the entire Stirling volcanic belt. Granges Exploration carried out a third phase of deep drilling at the old Smithfield mine in Colchester County, held under option from Bruce Dunlop. Cuvier Mines drilled early in the year for base metals and barite at Burlington and Goshen, Hants County.

Tin and tungsten were targets for exploration by Noranda Exploration in the Ship Harbour area and by Kidd Creek Mines Limited at Tangier Grand Lake; both sites are located on the Musquodoboit Batholith in Halifax County. Kidd Creek was also active in the Wallaback Lake area, Lunenburg County and Sangster Lake, Guysborough County.

Rio Algom was active all year with predevelopment work at its tin ore body at East Kemptville, Yarmouth County and additional geochemical, geophysical exploration, and drilling in surrounding areas.

Billiton Canada Ltd., did extensive exploration for tin and tungsten on a large block of claims centred in Shelburne County, to the east of Rio's East Kemptville deposit. They conducted programs at Ship Harbour, Halifax County and at Caledonia, Queens County and carried out diamond drilling for base metals in the Walton-Noel area, on the Horton-Windsor contact in Hants County.

REGISTRY MINERAL AND PETROLEUM RIGHTS

R. Slater, P.Eng.
Registrar of Mineral and Petroleum Rights

The Mineral and Petroleum Rights Registry is responsible for accepting applications for mineral and petroleum rights, and subject to verification for accuracy and availability of lands, for issuing and registering the licences or leases. In addition, any documents affecting licences, such as transfers of title, assignments of interest, option agreements, special licences, and exploration agreements are registered by this office. The Registry also receives all statements of exploration expenditures and assessment reports that pertain to the consideration for renewal of licences or leases. In addition to matters directly affecting licencing, maps showing the disposition of lands under licence or lease are maintained and continually updated. Applications for underground storage rights and treasure trove licences are processed through this office. Information concerning production and employment in Nova Scotia's mines and quarries is also received by the Registry.

A large number of enquiries from industry, the public, and other government departments are answered each year. Procedures for obtaining rights, past exploration and mining activities, statistical information on production from operating properties, and general questions concerning licences issued, acreages held, etc. are the major subjects of inquiries. A notable service to the public and industry is the printing and supplying of the land disposition map sheets (1:31,680 scale) which are obtainable at cost. The Registry is responsible for all fees, bonds, and other monies due for licences, leases, statutory work deposits, payments in lieu of work, and sale of maps and other items such as acts and publications.

During 1983, the amount of assessment work reported for exploration in the Province (Table 5) has increased from 1982. A record number of assessment reports was received in 1983.

TABLE 5. Mineral exploration trends in Nova Scotia.

		1976	1977	1978	1979	1980	1981	1982	1983
Summary (onshore)									
Value of Reported Assessment Work		$ 1,600,000	$ 3,800,000	$ 5,900,000	$ 4,700,000	$ 7,564,000	$ 8,441,270	$ 4,100,000	$ 4 200 000
Exploration Expenditure		-	-	-	-	-	$14,608,000	$ 5,553,000	$ 7,000,000[1]
Total Licences Issued		1 489	2 894	2 393	1 841	2 559	1 952	1 298	1 350
Claims Recorded Onshore[2] area in acres (hectares in parentheses)									
Base Metal	claims	34,434	70,936	38,597	40,497	88,703	68,863	39,626	40,630
	acres	1,377,360	2,837,440	1,543,880	1,619,880	3,548,120	2,754,520	1,585,040	1,625,199
	hectares	(557 398)	(1 148 296)	(624 799)	(655 556)	(1 435 904)	(1 114 739)	(648 871)	(657 709)
Uranium	claims	21,526	48,721	31,978	30,920	25,483	6,225	-	-
	acres	861,040	1,948,840	1,279,120	1,236,800	1,019,320	249,000	-	-
	hectares	(348 451)	(788 685)	(517 653)	(500 526)	(412 513)	(100 769)	-	-
Salt, Potash	claims	224	887	1,148	2,256	13,505	5,225	1,065	505
	acres	8,960	35,480	45,920	90,240	540,200	209,000	42,600	20,200
	hectares	(3 626)	(14 359)	(18 584)	(36 519)	(218 616)	84 581)	(17 240)	(8 175)
Coal	claims	-	-	-	-	-	4,880	3,072	4,565
	acres	-	-	-	-	-	195,199	122,880	182,599
	hectares	-	-	-	-	-	(78 996)	(49 729)	(73 897)
Number of Mineral Assessment Reports		70	90	132	126	140	150	124	188
Total Areas Held Under Licence	acres	2,247,360	4,821,760	2,868,920	2,946,920	5,107,640	3,212,520	1,627,640	1,827,999
	hectares	(909 475)	(1 951 340)	(1 161 036)	(1 192 601)	(2 067 033)	(1 379 085)	(709 219)	(739 781)

TABLE 5. Continued.

		1976	1977	1978	1979	1980	1981	1982	1983
Petroleum Licences Issued area in acres (hectares in parentheses)									
Land Areas	licences	29	20	37	44	52	99	68	93
	acres	2,678,833	2,431,592	3,452,573	3,456,875	4,284,909	6,230,046	5,419,952	8,048,306
	hectares	(1 084 109)	(984 052)	(1 397 237)	(1 398 978)	(1 734 079)	(2 521 265)	(2 193 424)	(3 257 104)
Submarine Areas	licences	179	160	160	147	151	172	168	-
	acres	37,273,269	33,634,964	33,634,964	31,221,055	31,589,070	34,786,199	33,965,867	-
	hectares	(15 084 285)	(13 611 883)	(13 611 883)	(12 634 987)	(12 783 921)	(14 077 781)	(13 745 798)	-

[1]estimate from Nova Scotia Department of Mines and Energy sources.
[2]claims are 40 acres or 16.2 ha each

ENERGY BRANCH

J.R. Hornby, P.Eng., Assistant Deputy Minister

Nova Scotia is heavily dependent on petroleum for its energy needs, i.e. approximately 70 per cent of its primary energy, most of which is from insecure foreign sources.

The provincial government has established a clear objective to reduce this dependence by developing Nova Scotia's indigenous energy resources, by gaining access to Canada's energy resource base, and by improving the efficiency of energy use.

The mandate of the Energy Branch, which is one of the two main Branches of the Department, is to initiate and implement policies and programs to achieve the Government's energy goals. The Branch consists of two divisions — Energy Resources and Energy Management. The Energy Resources Division focuses on the development of Nova Scotia's indigenous resources, particularly offshore oil and gas, coal, and peat. The Energy Management Division focuses on the acquisition of energy from outside the Province and the utilization of energy within the Province.

ENERGY RESOURCES DIVISION

J.R. Hornby, P. Eng., Acting Director

INTRODUCTION

The Energy Resources Division is accountable for the effective evaluation, promotion, and regulation of Nova Scotia's energy resources. The Division has centred its activities in the two primary hydrocarbon resource areas: petroleum (oil and gas) and coal/peat.

In 1983 - 84 the Petroleum Resources Section's activities increased considerably in scope, as exploration and development interest in Nova Scotia increased, both offshore and onshore. In a year of peak offshore exploration activity, the Section was heavily involved in many areas including the negotiation of exploration agreements, the monitoring of land relinquishments and drilling results, the preparation of legislation to support the Canada - Nova Scotia Agreement, and the preparation of the Province's response to Mobil's Venture Development Plans.

The Coal Development Section was similarly active in evaluating and promoting the Province's coal and peat reserves. This Section now has three major areas of activity: coal and peat exploration, coal and peat development and utilization, and oil substitution programs. The section has worked closely with both private and public organizations during the year to promote new mine development. It also initiated vital research and development which will lead to greater demand for Nova Scotia coal both in traditional markets and in new applications.

Petroleum Resources Section

C. Andrew Parker, P.Eng., Manager

INTRODUCTION

The Petroleum Resources Section is responsible for monitoring, evaluating and regulating petroleum exploration and development activities onshore and, in conjunction with the Nova Scotia office of the Canada Oil and Gas Lands Administration (COGLA), offshore Nova Scotia.

The 1983 - 84 fiscal year proved to be a very exciting and productive period. Exploration activity on the Scotian Shelf reached record levels with eight rigs operating at year end. The Venture structure was further delineated and significant progress was made on planning for its development. A drilling program commenced onshore indicating a renewed interest in the petroleum potential there.

OFFSHORE EXPLORATION

The Petroleum Resources Section worked closely with COGLA in the monitoring and administration of all offshore activities. The staff maintained close liaison with the Nova Scotia members of the Canada - Nova Scotia Offshore Oil and Gas Board to advise them on key issues. In addition, they provided technical advice and pertinent information on offshore petroleum issues to various departments of the Provincial Government.

During the 1983 - 84 fiscal year, the Section reviewed, with COGLA, nine different exploration agreements involving 5,114,165 acres (2 069 702 ha), which were ultimately approved by the Board, finalizing the first round of exploration agreements under the Canada - Nova Scotia Agreement. These nine agreements represent $418 million in exploration expenditures to be spent over the next six years. They account for approximately one-third of all the first-round exploration agreements now approved for offshore Nova Scotia, which call for in excess of $2 billion to be spent between 1982 and 1988. The blocks for which exploration agreements were approved are shown in Figure 6.

The first relinquishments of offshore lands to the Crown, a provision of all current offshore exploration agreements, took place during the fiscal year. Staff monitored and participated in the relinquishment to the Crown of 4,892, 554 acres (1 980 017 ha) of offshore lands.

In 1983 - 84, ten offshore wells were started; nine were wildcat wells and one was a delineation well. Of these ten wells, seven were completed and three were tested including the Venture B-52 appraisal well. Two of these wells, Arcadia J-16 and Glenelg J-48, were recognized as significant gas discoveries. They will require further delineation to evaluate their commercial potential. Locations of the wells are shown on Figure 7.

The first blowout of an offshore well since drilling commenced in 1967 occurred during the past fiscal year. During the blowout of the Uniacke G-72 well, the Section participated in the task force monitoring the situation. An official inquiry formed by COGLA to look into the cause of the incident included a member from the Department staff who was involved in the investigation and in the final report.

During the past fiscal year, Mobil and its partners made significant progress in preparing evaluation studies and submissions in connection with development of the Venture gas field. This Section reviewed Mobil's environmental and socio-economic impact statements as well as the final reports

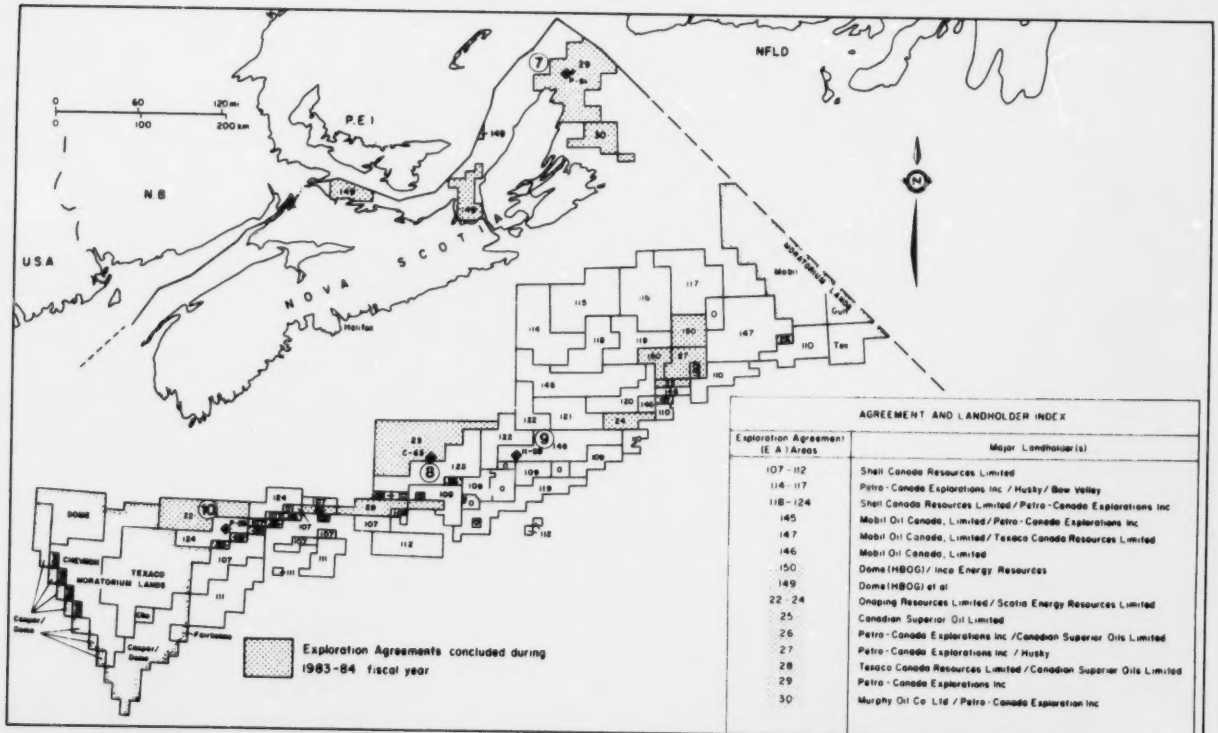
NFLD
P.E.I
N.B
USA
NOVA SCOTIA
Halifax
Mobil
Texaco
Dome
CHEVRON
TEXACO MORATORIUM LANDS
Exploration Agreements concluded during 1983-84 fiscal year
AGREEMENT AND LANDHOLDER INDEX
Exploration Agreement (E A) Areas
Major Landholder(s)
107 - 112 Shell Canada Resources Limited
114 - 117 Petro-Canada Explorations Inc / Husky / Bow Valley
118 - 124 Shell Canada Resources Limited / Petro-Canada Explorations Inc
145 Mobil Oil Canada, Limited / Petro-Canada Explorations Inc
147 Mobil Oil Canada, Limited / Texaco Canada Resources Limited
146 Mobil Oil Canada, Limited
150 Dome (HBOG) / Inco Energy Resources
149 Dome (HBOG) et al
22 - 24 Onaping Resources Limited / Scotia Energy Resources Limited
25 Canadian Superior Oil Limited
26 Petro-Canada Explorations Inc / Canadian Superior Oils Limited
27 Petro-Canada Explorations Inc / Husky
28 Texaco Canada Resources Limited / Canadian Superior Oils Limited
29 Petro-Canada Explorations Inc
30 Murphy Oil Co Ltd / Petro-Canada Exploration Inc

Figure 6. Exploration agreements concluded during the 1983 – 84 fiscal year

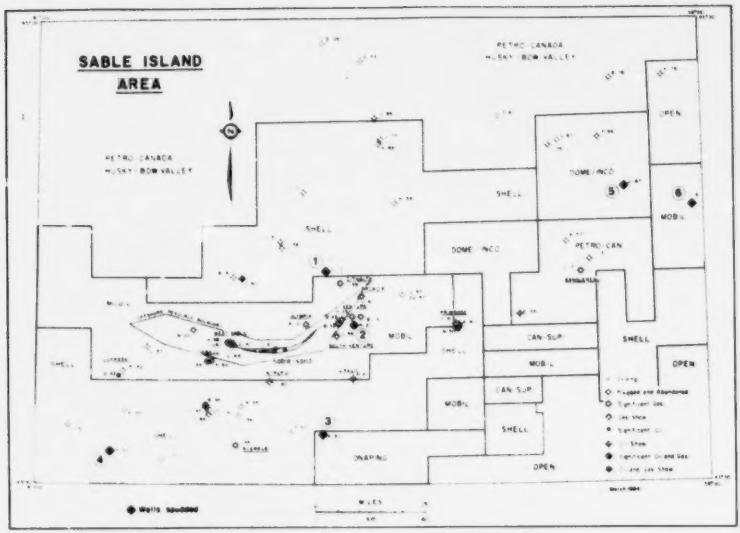

Figure 7. Offshore drilling activity during the 1983 - 84 fiscal year

submitted by the federal-provincial panels established to review these two aspects of the Project. Staff also played an active role in reviewing, evaluating, and co-ordinating the Province's response to the Venture Development Plan, which was submitted to the Canada - Nova Scotia Offshore Oil and Gas Board in January 1984.

ONSHORE EXPLORATION

A number of oil companies were active in Nova Scotia. The Section monitored a drilling program by CORKAN Engineering of Canada Ltd. in the Strait of Canso area of Cape Breton and Antigonish Counties. Two wells, out of an approved 10-well program, were drilled to their target depths and four additional wells were started.

Petroleum exploration licences were reviewed and negotiated with Brant, Hughes, Marchant and Win-Eldrich for exploration in the Province. The licences are identified in Figure 8. At the end of the fiscal year, 8,257,357 acres (3 341 752 ha) were held under provincial petroleum exploration licence.

The Petroleum Resources Section made progress on an exploration agreement framework to be negotiated by all licence holders, which will consolidate separate licences and outline work requirements in more detail.

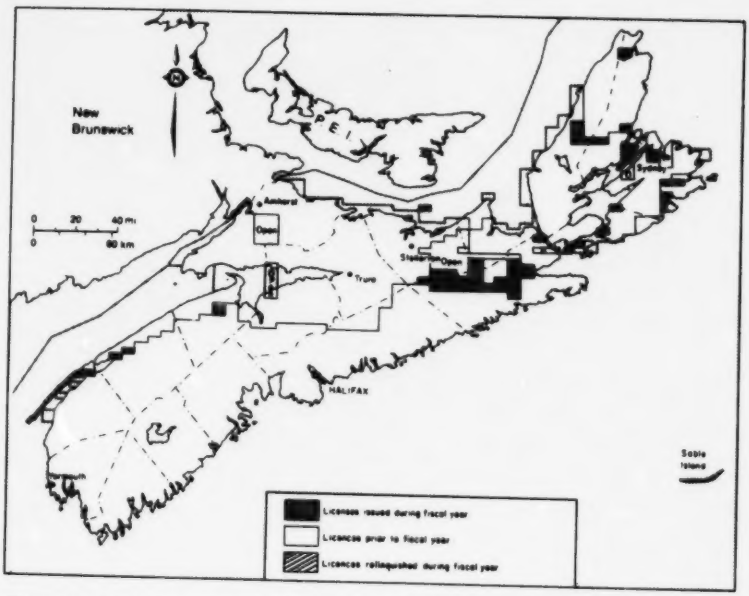

Figure 8. Onshore exploration licenses issued during the 1983 – 84 fiscal year

OTHER ACTIVITIES

Staff of the Section made 11 inspections on onshore drilling rigs, monitored seven inspections of offshore drilling rigs, and made three inspections of offshore vessels. Various working cross-sections, correlations, and lithologic strip logs were drafted, maintained, and updated. Geological studies of Mobil's Venture wells were continued and new geological studies on Mobil's Arcadia well and Shell's Glenelg and Uniacke wells were initiated. The comparison of these wells with the Venture wells allowed a better understanding of the stratigraphy and structures in the Sable Island area.

A study of offshore petroleum development scenarios was initiated. The objective of the study is to evaluate and recommend gas and oil production systems and their associated transportation and processing facilities for a range of reserve sizes and offshore locations.

The offshore licence map and several other offshore maps and tables were kept current for internal and public use. A slide presentation on offshore activity was updated and several other presentations focusing on petroleum were compiled.

The Section provided input to Nova Scotia's submission to the National Energy Board (NEB) on Energy Supply and Demand. Staff compiled a variety of maps and display materials and participated in the Canadian Offshore Resources Exposition (CORE) and the Department of Mines and Energy Open House. Staff continued to be active on a variety of committees, including the Canadian Petroleum Industry Training Society Course Examination and Certification Committee, the Environmental Co-ordinating Committee, the Petroleum Technology Training Advisory Board Committee, and the Sable Island Environmental Advisory Committee.

In September 1983, the Section produced an update of the publication *Oil and Gas Exploration in Nova Scotia, 1982–83.*

Coal Resources Section

C.E. Bain, P.Eng., Manager

INTRODUCTION

The Coal Resources Section is responsible for the evaluation and promotion of the Province's coal and peat.

The Section's work entails an ongoing investigation of the nature of Nova Scotia coals from their geological character to their different methods of utilization as an energy fuel. This knowledge is used to encourage, assist and co-ordinate the development of new mines and market uses for our coal and peat resources by private and public organizations.

In pursuing these objectives the Section's work is presently divided into several major activities.

COAL EXPLORATION

Activities in coal exploration for 1983 were centred in the Sydney, Springhill and Pictou coalfields as shown in Figure 9.

Sydney Coalfield

During 1983, the inventory and evaluation of near surface coal resources in the Sydney coalfield continued. A detailed report on the Tracy seam at Broughton was completed based on the previous year's drilling. Late in the

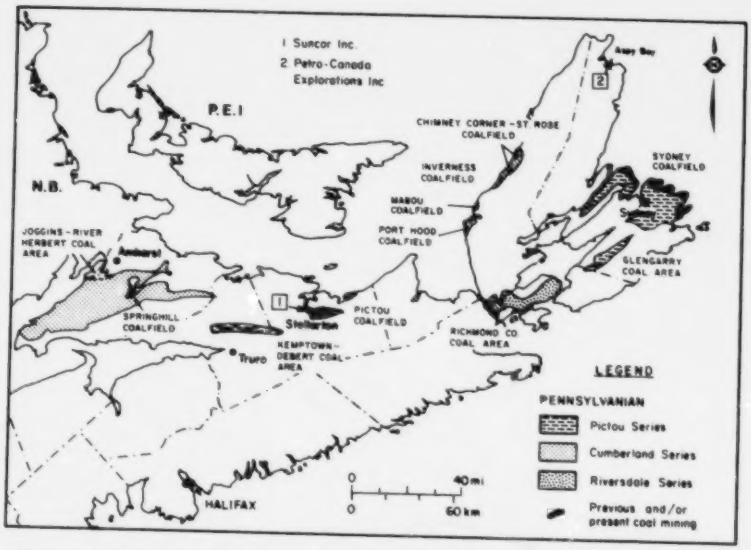

Figure 9. Coalfields of Nova Scotia and coal exploration programs

year, a drilling program was begun which was dedicated to making final the inventory of thin seams of the upper *Linopteris oblique* zone of the Morien Group in the Donkin area.

A reconsideration of the geology of the Richmond County coal area was begun. Several minor coal occurrences in the Riversdale Group have been exploited in the past. These ocurrences, which are limited in extent and have complicated structures, may suggest other areas in Richmond County where coal may occur in a less disturbed environment.

A coal occurrence in a small isolated basin of Mabou Formation rocks (the Maple Creek Syncline) east of Glendale, Inverness County, was investigated. Stratigraphic testing of this occurrence is proposed.

In co-operation with personnel of the Cape Breton Coal Research Laboratory of Energy, Mines and Resources Canada, the feasibility of applying geostatistical techniques to coal reserves in the Sydney coalfield was evaluated. A test case has been prepared and further applications will be investigated.

Springhill Coalfield

In 1983 geological evaluation of the coal resources in the Springhill coalfield continued as the natural progression of an ongoing program initiated in 1975. The investigations are part of two broad categories: diamond drilling programs and depositional environment studies. The two are closely related; much information on the depositional environment is supplied by diamond drilling.

Diamond Drilling Projects. Five diamond drilling projects were undertaken during the year from May to October.

(1) diamond drilling of the No. 3 seam crown pillar with a view to a potential open-pit site

(2) split-tube drilling of the Springhill coal waste bank overlying the No. 3 seam crown pillar

(3) diamond drilling of the No. 3 seam (upper leaf) at the Novaco open-pit test site

(4) diamond drilling of a strata control test hole immediately down-dip from the Novaco open-pit test site to be evaluated by the Strata Control Group of the Cape Breton Coal Research Laboratory

(5) investigation of the Nos. 7 and 6 seams north of previous mining.

Depositional Studies. Detailed correlation of coal seam stratigraphy and the insight gained into the larger aspects of the stratigraphy of the Springhill coalfield through extensive diamond drilling programs since 1977, form the foundation of depositional environment studies currently being conducted by the geologist of the Section. By studying the depositional environments of the coal-bearing rocks, better deductions can be made about the location and quality of coal.

Pictou Coalfield

Investigations in the Pictou coalfield consisted of two holes, P-54 and P-55, drilled on the northern boundary of the coalfield (Fig. 10).

The holes were located to investigate the structure in the vicinity of the large faults that mark the northern end of the coalfield and to determine whether the Westville coal seams were located on the northern flank of the basin.

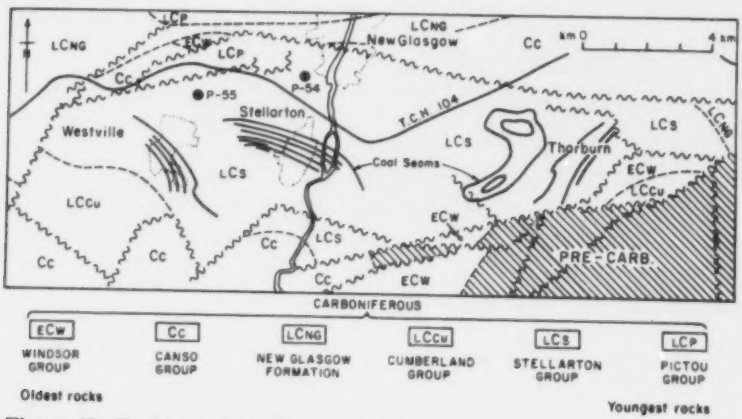

Figure 10. Geology of the Pictou coalfield

The holes designated P-54 and P-55 were drilled to a depth of 3337 feet (1017 m) and 1068 feet (490 m) respectively.

In hole P-54, the Stellarton coal seams were intersected in the top 1,477 feet (450 m). Fossil bivalves were identified as *Anthroconauta* and as being Westphalian in age.

Hole P-55 was drilled near Westville. This hole intersected the Stellarton coal horizons in the top 1,149 ft. (350 m).

Exploration Initiatives

During 1983 two private companies held special licences to explore for coal in the Province. These were Suncor Inc. (see Fig. 9), which conducted seismic and diamond drilling programs to investigate coal resources in Pictou County, and Petro-Canada which holds acreage offshore in the Aspy Bay area of Cape Breton. Several other companies, not yet holding exploration licences, contacted the Coal Resources Section in 1983 for information and consultation on possible coal reserves in the Province. One of the companies has a coal exploration licence pending for early 1984.

The Coal Resources Section continued its involvement in the possible development of a small underground mine in the Springhill area by the private sector and provided additional technical information regarding the Scott and Acadia seams in Pictou County for the Pioneer Coal Company.

COAL DEVELOPMENT AND UTILIZATION

Coal is one of the most important segments of the Province's mining industry. The future of coal in the medium to long term will be enhanced by the identification of new uses for this valuable resource as well as by the development of optimum mining, handling, and transportation systems. One of the prime objectives of the Coal Development Section is to encourage and co-ordinate the development and efficient use of coal, coal products, and peat. In 1983 the Section was involved in a variety of activities to promote development of the industry and increased utilization of these resources, in particular:

(1). Monitoring of all coal related research and development activity in the Province in terms of applicability to the industry, economics, timing and the potential benefits to the Nova Scotia coal industry.

(2). Evaluation of coal exploration proposals from the private sector in order to ensure that the resource will be developed with minimum waste and maximum advantage for the industry and the people of Nova Scotia.

(3). Identification of problem areas and direction of new research towards solving these problems. Some of the problems facing the coal industry in the Province that were addressed by the Section are coal transportation, blending facilities, optimum use of existing infrastructure, cost effective means of reducing stack emissions, market competition with alternate fuels and research into new exploration areas and existing mine geology.

(4). Evaluation of international developments in new technologies concerning coal exploration, development, production, beneficiation, conversions, and utilization regarding their applicability to the Nova Scotia coal industry.

(5). Administration of coal related programs now in progress in the Province such as coal liquefaction, fluidized bed, coal-liquid mixtures, etc. Many coal related projects have received funding through the Canada - Nova Scotia Agreement on Oil Substitution. The Section is closely involved in this program through its Technical Projects Coordinator who screens project proposals and carries out detailed follow-up of projects approved for funding.

During 1983 the Coal Resources Section was instrumental in acquiring funds for a project to assess and develop the beneficiation potential of eastern Canadian coals. This program is being carried out under the auspices of the Committee on Atlantic Coal with funding being provided through the Energy, Mines, and Resources Canada, Coal Utilization Program.

Committee on Atlantic Coal (CAC)

The CAC was established in 1982 in response to a need to bring the scientific expertise in diverse institutions in the Atlantic Provinces to bear on specific problems related to the mining and utilization of coal and to improve communication between those responsible for managing the coal industry and for those conducting research and development work.

The CAC has organized four working groups, these are: Coal-Liquid Mixtures, Coal Beneficiation, Coal Pyrolysis, and Coal Mining. The Coal Mining group was formed late in the 1983 - 84 fiscal year. Research and development activities of the first three working groups are represented in Figure 11.

Coal Liquefaction

Liquefaction studies of Nova Scotia coals in 1983 was again conducted under the auspices of the Canada Centre for Mineral and Energy Technology (CANMET), and the Nova Scotia Department of Mines and Energy. The fourth phase of the program was completed in 1983. This phase of the work concentrated on high severity donor solvent liquefaction and catalytic hydrogenation of Sydney area coals. A total of ten coal samples from three operating mines in Cape Breton were tested and analytical methods for the separation and characterization of coal-derived liquids were reviewed. It was shown that the Hub seam coal from the Prince mine is the most reactive feedstock at thermal liquefaction conditions. Batch autoclave experiments showed that catalytic hydrogenation produces higher oil yields than donor solvent extraction.

Phase five work began in late 1983. Process studies during this phase will focus on conventional single-stage catalytic hydrogenation and second generation two-stage thermal/catalytic liquefaction.

Canada - Nova Scotia Oil Substitution and Conservation Agreement

The Canada - Nova Scotia Agreement on Oil Substitution and Conservation was initiated in 1977 by payment of $9.2 million into an interest-bearing

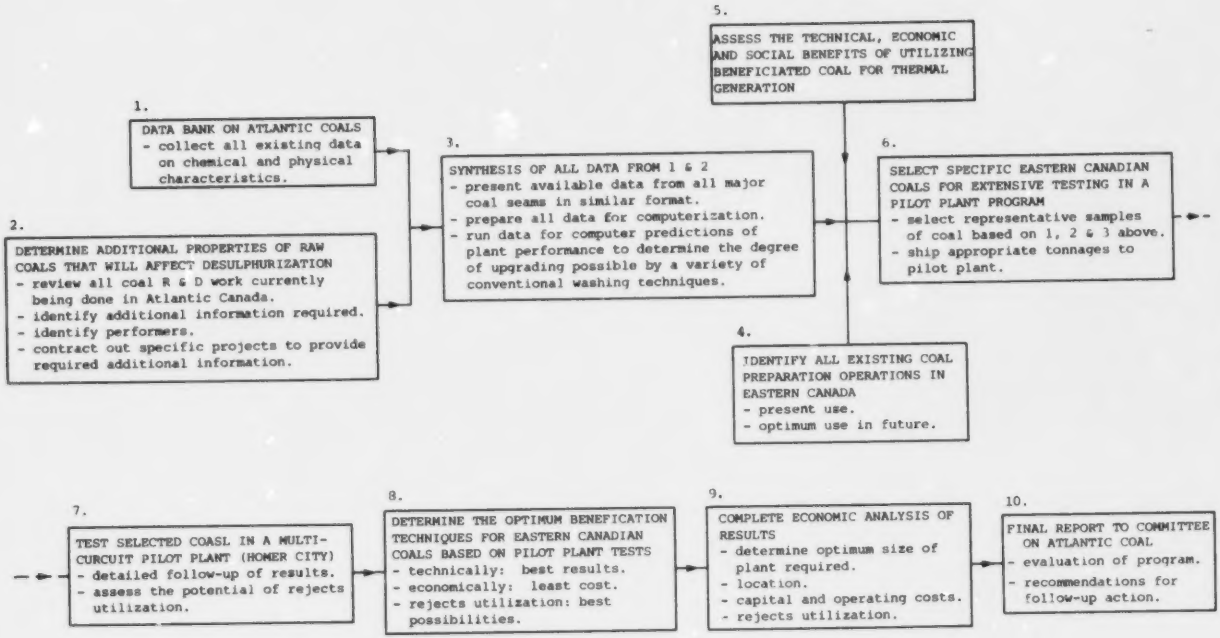
1.
DATA BANK ON ATLANTIC COALS
- collect all existing data on chemical and physical characteristics.
2.
DETERMINE ADDITIONAL PROPERTIES OF RAW COALS THAT WILL AFFECT DESULPHURIZATION
- review all coal R & D work currently being done in Atlantic Canada.
- identify additional information required.
- identify performers.
- contract out specific projects to provide required additional information.
3.
SYNTHESIS OF ALL DATA FROM 1 & 2
- present available data from all major coal seams in similar format.
- prepare all data for computerization.
- run data for computer predictions of plant performance to determine the degree of upgrading possible by a variety of conventional washing techniques.
4.
IDENTIFY ALL EXISTING COAL PREPARATION OPERATIONS IN EASTERN CANADA
- present use.
- optimum use in future.
5.
ASSESS THE TECHNICAL, ECONOMIC AND SOCIAL BENEFITS OF UTILIZING BENEFICIATED COAL FOR THERMAL GENERATION
6.
SELECT SPECIFIC EASTERN CANADIAN COALS FOR EXTENSIVE TESTING IN A PILOT PLANT PROGRAM
- select representative samples of coal based on 1, 2 & 3 above.
- ship appropriate tonnages to pilot plant.
7.
TEST SELECTED COASL IN A MULTI-CURCUIT PILOT PLANT (HOMER CITY)
- detailed follow-up of results.
- assess the potential of rejects utilization.
8.
DETERMINE THE OPTIMUM BENEFICATION TECHNIQUES FOR EASTERN CANADIAN COALS BASED ON PILOT PLANT TESTS
- technically: best results.
- economically: least cost.
- rejects utilization: best possibilities.
9.
COMPLETE ECONOMIC ANALYSIS OF RESULTS
- determine optimum size of plant required.
- location.
- capital and operating costs.
- rejects utilization.
10.
FINAL REPORT TO COMMITTEE ON ATLANTIC COAL
- evaluation of program.
- recommendations for follow-up action.

Figure 11. Development of beneficiation potential for eastern Canadian coals

account from which funds have been periodically withdrawn to support eligible energy related projects.

Between 1977 and 1983 ten projects were completed, the majority of which have been related to the generation of electrical energy. Three other projects, the Fourth Lake hydro development, coal demethanation in Pictou County, and coal liquefaction studies are continuing.

New projects initiated in 1983 included:

(1). Additions and alterations to the flame tunnel at the Centre for Energy Studies at a cost of $98,000.00

(2). A training program for flame diagnostic equipment at the Centre for Energy Studies, Technical University of Nova Scotia, in Halifax, at a cost of $27,500.

(3). A study to determine the feasibility and economics of utilizing fuel peat in southwestern Nova Scotia. Cost of the program is approximately $75,000.

(4). Fundy Tidal Power Project: a study to further evaluate the feasibility of the development of tidal power. Cost of this program is approximately $500,000.

(5). Deepening of demethanation well NST82-P7. In 1982 NovaCorp drilled demethanation well NST82-P7 in Pictou County. In 1983 a program was designed which would allow the lower 100 feet (30 m) of the P7 well to be brought into production. Cost of this program was approximately $35,000.

PEAT INVENTORY

Peat is an accepted alternate fuel for energy production in many countries around the world. For several decades, peat fuels have been utilized at all scales of energy production.

Nova Scotia has about 247,100 acres (100 000 ha) of peatland (about 4% of the Province) concentrated in five or six regions of the Province (Fig. 12). In 1983, as part of the ongoing inventory program, Guysborough County and Cumberland County were assessed to determine the extent of their peat resources.

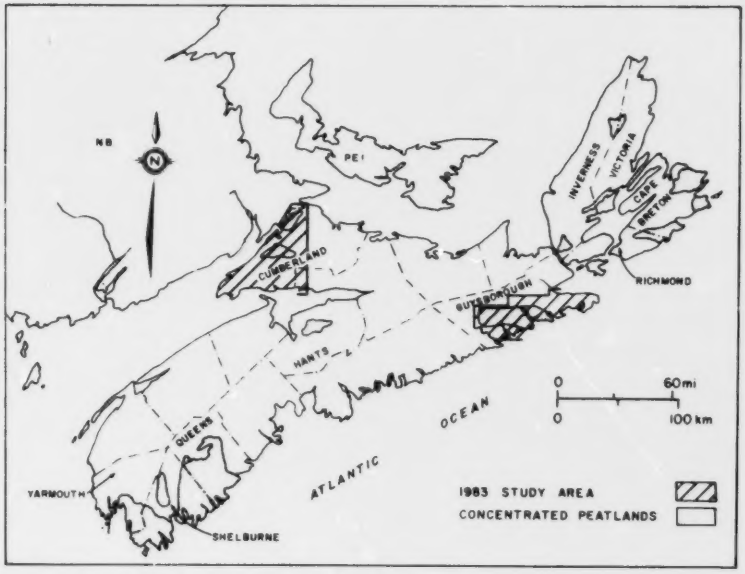

Figure 12. Location of peatlands in Nova Scotia

Cumberland County

The deposits evaluated in this region (Fig. 13) represent approximately 114 million cubic yards (87 million m^3) of peat of which about 25 per cent is classed as fuel grade ($H_{5\text{-}10}$). The bogs are on average 8.2 feet (2.5 m) in depth, though sometimes are as deep as 26 feet (8 m). Data from these peatlands show large amounts of good quality moss peat that could be developed for horticultural use.

The entire County is estimated to have approximately 218 million cubic yards (167 million m^3) peat in some 16,556 acres (6700 ha) of peatland of while some 75 per cent would be classed as suitable horticultural grade ($H_{1\text{-}4}$).

Guysborough County

County soil surveys (Nova Scotia Soil Survey Reports 1945 - 73) indicate 35,600 acres (14 400 ha) of peatland (excluding salt marshes) in the county. Estimates of total resource show nearly 471 million cubic yards (360 million m^3) of peat, the majority of which is relatively isolated in small deposits

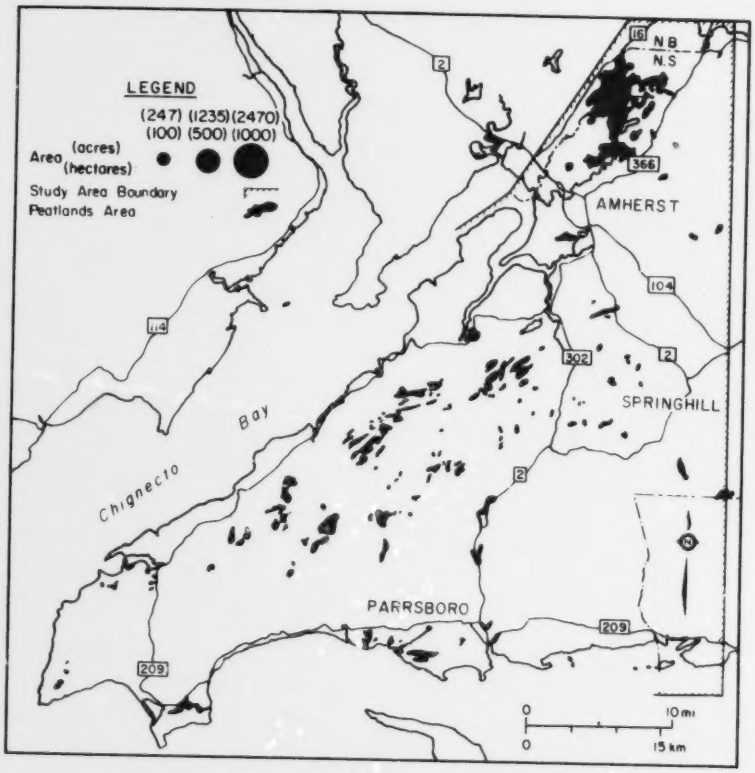

Figure 13. Peatlands inventory of Cumberland County

throughout the region. This resource is mainly found south of Chedabucto Bay ranging from Canso across to the Halifax-Guysborough County line.

The relatively small peat deposits in Guysborough County are usually ombrogenic in nature with well pronounced, poorly humified or "moss" peat domes. About 150 deposits were sampled through the course of the program (Fig. 14) revealing approximately 128 million cubic yards (98 million m^3) of peat of which 20 per cent can be classified as "fuel grade" peat ($H_{5\text{-}10}$). The bogs surveyed were on average 6.5-10 feet (2-3 m) deep, with specific sites reaching as deep as 30 feet (9 m).

In terms of resource, sampled deposits reveal about 12.1 million tons (11 million t) of peat moss and about 4.4 million tons (4 million t) of fuel grade peat. However, due to the relative isolation of the majority of deposits sampled, only a few could be considered commercially viable. There have

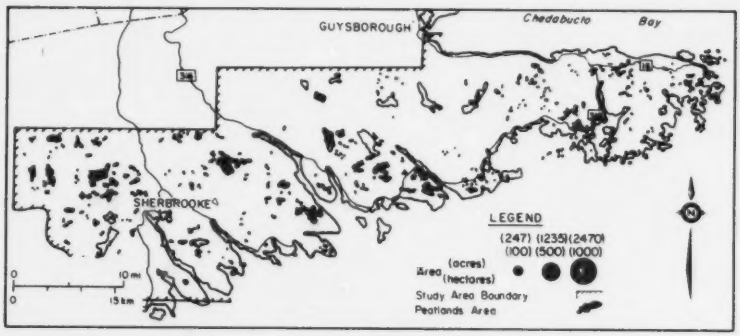

Figure 14. Peatlands inventory of Guysborough County

been earlier attempts of peat moss extraction by dredge and press methods, but at present all have been abandoned due to high operation costs.

Remote Sensing

A joint project sponsored by the Nova Scotia Department of Mines and Energy and the Nova Scotia Land Survey Institute continued during 1983 to assess the potential of using LANDSAT imagery and a computerized image analysis system for mapping peatlands in southwestern Nova Scotia.

Methodology developed in this project will hopefully allow computerized mapping of peat deposits across the Province. Eventually these techniques may be utilized in other mapping programs across Canada. The final product will be a series of 1:250,000 peatland maps showing regional summaries of the extent and types of peatlands across the Province.

Summary

To date the Inventory Program has covered a total of 55,720 acres (27 000 ha) of peatlands on mainland Nova Scotia. The volumes associated with this total area are: 85 million cubic yards (65 million m^3) horticultural grade peat ($H_{5\text{-}10}$). These volumes equate to 10.5 million tons (9.5 million t) of moss peat at 50 per cent moisture content and 4.6 million tons (4.2 million t) of fuel peat under the same conditions.

Extrapolation of these data provide estimates of resource in the studied regions of 19.8 million tons (18 million t) moss peat and 8.8 million tons (8 million t) fuel peat (50% moisture content) to date.

ENERGY MANAGEMENT DIVISION

C. Ryan, P.Eng., Director

INTRODUCTION

The Energy Management Division has four primary responsibilities:

1. the evaluation and analysis of policies and technologies affecting energy supply and demand,
2. the co-ordination of energy planning and of provincial submissions to energy regulatory agencies,
3. the provision of energy management and conservation programs, fuel substitution programs, and renewable and indigenous energy resource programs, and
4. the provision of programs that increase public awareness of energy conservation, energy supply options, provincial energy policies, plans and programs.

These responsibilities are met through the activities of three sections: Economics and Statistics, which provides energy planning, policy evaluation, statistical analyses, and regulatory submissions; Energy Engineering, which carries out technical analyses and delivery of energy management, fuel substitution and renewable energy programs primarily to the business and public sectors; and Public Programs, which provides and co-ordinates information transfer activities and delivery of programs to the residential sector.

HIGHLIGHTS

Impending development of offshore energy resources was responsible for a substantial increase in energy planning and analysis activity in the 1983 - 84 fiscal year. A number of major planning studies were initiated and completed during the year that will contribute to appropriate provincial response to the development, transmission, and distribution of Nova Scotia natural gas later in the 1980s and beyond.

Among these were a study of future pricing, markets, and competitive suppliers of Nova Scotia natural gas in the northeastern United States. Another study, *Introduction of Natural Gas to Nova Scotia*, describes the labour and manufacturing opportunities likely to result from onshore gas transmission, distribution, and conversion. *Propane Gas Market Pre-Build Feasibility Study* is a report on the economic and technical aspects of prebuilding a market in Nova Scotia with propane for natural gas by construction of a permanent distribution system.

The development of offshore energy resources will entail numerous applications to the National Energy Board so the Division formed an interdepartmental committee to co-ordinate these submissions. In addition, the Division prepared submissions by the Province to NEB hearings on *Energy Supply and Demand 1983 - 2005* and *Heavy Fuel Oil Imports into Eastern Canada*. The Division also prepared analyses of changes in federal energy policies, energy pricing, and supply and demand in Nova Scotia.

Two federal/provincial agreements, the Canada - Nova Scotia Subsidiary Agreement on Energy Conservation and the National Energy Audit (Ener$ave) Program Agreement, expired on March 31, 1984. The period to March 31, 1985, was designated for cleanup of commitments made prior to the expiry of the agreements. A number of Energy Management programs experienced dramatic increases in activity during the 1983 - 84 fiscal year due to the impending approach of the end of cost-shared agreements and increased fuel prices.

The Pilot Projects Program made commitments of financial assistance totalling $1.5 million in 1983 - 84, up from $902,000 in 1982 - 83. The Small Scale Energy Demonstration Grant Program selected 76 projects from 231 proposals received providing financial assistance totalling $327,000. A new program, the Small Business Energy Analysis and Grant Program, started in September 1983. More than 280 energy analyses were performed and 88 grant applications processed during the fiscal year. The Ener$ave Program performed 364 energy audits in fiscal year 1983-84 on industries, businesses, and institutions. Savings worth $2.7 million annually were identified. The Consulting Follow-Up Grant Program authorized 118 consulting grants worth a total of $615,000.

In the residential sector, the Division continued to receive and respond to public demand for advice, information and publications relating to all aspects of residential energy conservation and fuel substitution. Some 6000 enquiries were received on the Enerinfo line alone. A number of new publications and audio-visual materials were produced and a highly successful course on constructing passive solar greenhouses was designed and presented.

The Division monitors and provides statistical information on energy supply and demand on a continuing basis and produces an annual report on the topic. Primary energy consumption in Nova Scotia decreased by 2.2 per cent during the 1983 calendar year to 219.3 trillion (231 317.6 trillion j) Btus. This follows a decline of 9.2 per cent in 1982. Primary energy use is defined as the total energy input into the economy and includes petroleum, coal, hydroelectricity, and natural gas.

Sales of refined petroleum products dropped 7.1 per cent in 1983 following a 10 per cent decline in 1982. The 24.1 million barrels (3846.4 million L) total for 1983 is down from 33.4 million barrels (5330.6 million L) in 1978. Petroleum accounted for 68.2 per cent of primary energy consumption in 1983, down from 71.8 per cent in 1982. This reflects the success of the Province's oil substitution and energy conservation programs. It occurred despite growth in the real provincial product in 1983.

Economics and Statistics Section

V. Harnish, Section Manager

INTRODUCTION

The Economics and Statistics Section evaluates and analyzes issues arising from energy developments and policies of a provincial, national and international nature and recommends appropriate responses. The Section also administers a comprehensive energy planning program and is responsible for statistical reporting of energy supply and demand in Nova Scotia.

The Section prepares reports, position papers, publications, and computer models and manages the preparation of studies by private consultants. Depending on the nature of the material, these studies are made available to other ministries, the public, energy corporations, and other governments and agencies. The Section also prepares and co-ordinates submissions on behalf of the Province to regulatory authorities such as the National Energy Board.

ACTIVITIES

During the 1983 - 84 fiscal year, issues resulting from the impending development of the Province's offshore energy resources occupied an increasing amount of the Section's time. The Section was frequently called upon to analyze and comment upon the economic implications and feasibility of energy projects.

Three major studies were undertaken by private consultants under the management and co-ordination of the Section that provided a basis for the development of government policy and action.

The *Introduction of Natural Gas to Nova Scotia* analyzed the impact of onshore gas transmission, distribution, and conversion from the point of view of business opportunities, labour requirements, worker safety, and

equipment and materials needs. About 200 copies of the final report were distributed to industry, labour, and government.

A thorough examination of energy supply and demand in the Northeastern United States was undertaken. It appears from preliminary results that this market will soon require volumes of natural gas which cannot be supplied by production from the United States.

The *Propane Gas Market Pre-Build Feasibility Study* determined that pre-building a provincial market for natural gas with propane would be too expensive on a provincial scale.

The potential economics of using compressed natural gas (CNG) as a motor transport fuel and the impact of mining in the Province were among other subjects assessed during the fiscal year. The Section also participated in emergency energy planning through the Interprovincial Advisory Committee on Energy and Northeast International Committee on Energy.

A major task undertaken by staff was the preparation of a Nova Scotia Energy Supply and Demand forecast for the period of 1983 - 2005. The final report was submitted to the National Energy Board (NEB) in January 1984, on behalf of the Province of Nova Scotia. The Section also prepared a submission to NEB hearings on the import of heavy fuel oil into Eastern Canada. An anticipated increase in NEB submissions as a result of offshore development caused the Section to establish a interdepartmental committee to manage preparation of the Province's submission to NEB hearings on Venture Gas Exports and Facilities and Transport of Venture Gas. This committee is expected to be especially active in the next several years.

The Section is also committed to keeping the Department current on energy statistics and trends. An energy fact sheet containing data on supply and demand, and pricing of coal, electricity, and petroleum products is produced at regular intervals. Each year an Energy Statistical Profile of the Province is published. The Section also obtains, prepares, and operates various computer models, including those used to determine pipeline cost of service, residential energy demand, and pricing forecasts.

The Section continued to administer the Electric Power Rate Subsidy Program, explain program changes, and prepare rate books for local utilities. Rates are analyzed for decision makers on a continuing basis.

The Energy Planning Project under the Canada - Nova Scotia Subsidiary Agreement on Energy Conservation is administered by the Section.

The Section is also co-ordinating a Load Management Program, funded under this Agreement, in which the Nova Scotia Power Corporation is gathering load data and assessing the potential of direct load control and various forms of indirect load management such as marginal cost-based, time-differentiated pricing.

Public Programs Section

J. Gordon, Section Manager

INTRODUCTION

The Public Programs Section is responsible for encouraging the more efficient use of energy and fuel substitution, primarily at the residential level. It does this by providing factual and motivational programs and information on energy. The Section also serves the public information needs of the Division by co-ordinating the production of technical and promotional printed material, audio-visuals, and advertising.

Public Programs is also responsible for monitoring and addressing significant residential energy conservation issues as well as assessing and surveying public attitudes towards energy.

A variety of educational and outreach programs are implemented by the Section, often in co-operation with other departments, groups, or associations. Activities are funded directly by the Nova Scotia Department of Mines and Energy as well as jointly under the Public Information Project of the Canada - Nova Scotia Subsidiary Agreement on Energy Conservation.

ACTIVITIES

Each year the Section receives thousands of requests from the public for advice and information. Requests are made in one of several ways. The Enerinfo phone line (1-424-5727), a Province-wide, toll free advisory service, accounts for the majority of information requests, numbering approximately 6000 in fiscal year 1983 - 84. Written requests, referrals from other agencies, and response to Section advertising and promotional material account for the remainder. Information provided ranges from the very general to the extremely specific and covers such topics as heating systems, air sealing, new home construction, and car fuel economy. In addition, a large and growing volume of educational requests for resource materials on energy matters are addressed during the year.

The Section also participates in major energy related trade shows each

year. The Enerinfo display used at these events is heavily patronized, numerous questions are answered by staff, and thousands of publications distributed. In addition, staff give seminars to smaller groups on topics such as wood heating, microwave cooking, air sealing, insulation, condensation and heating system upgrading. Staff also respond to requests for site inspections of homes with major problems. Forty-one inspections, followed by recommendations, occurred in the last reporting period.

Publications and posters are distributed to Nova Scotians and audio-visual material is made available on a loan basis. In addition to previously published material, the Section produced and distributed new publications dealing with home heating systems, condensation, air sealing and energy programs in the past year. Section staff also cooperated in the production and design of publications for other sections, including *1983 Energy Statistical Profile* and National Energy Board submissions.

One publication of particular interest is *Renewable Energy in Nova Scotia*. This 126 page book profiles residential renewable energy projects with the aid of more than 100 photographs and illustrations.

New audio-visual productions included a 19 minute slide/tape presentation on renewable energy projects in Nova Scotia and a 14 minute slide/tape presentation on residential energy auditing.

Energy Awards

Nova Scotia Energy Awards is an annual program that features presentation of awards by the Minister of Mines and Energy for outstanding contributions to energy management or fuel substitution. The following is a list of 1983 Nova Scotia Energy Award winners:

Category 1, Large Manufacturing
National Sea Products Ltd., North Sydney
18% energy reduction/unit of production.

Category 2, Business, Commerce, and Non-Government
Kidston Glass Company Ltd., Halifax
50% fuel reduction by improving the heating system and improving glazing.

Category 3, Governments
Fishermen's Memorial Hospital, Lunenburg
reduced energy consumption substantially by lighting changes,

heating/cooking improvements, temperature setback, and installation of a computerized energy management system.

Category 4, Organizations, Community Groups, and Individuals
Mr. & Mrs. Paul Mason, Head of St. Margaret's Bay
designed and built energy efficient home.
Mr. Bryne M. Williams, Dartmouth
reduced fuel oil use in older home from 1545 gallons to 310 gallons (7023 L to 1409 L) through a series of conservation measures.

Category 5, Energy Innovation
Hatfield's IGA, Springhill
reduced oil use by switching to a space heating system that burns waste cardboard. Award won in association with Parrsboro Metal Fabricators, Parrsboro, who designed, built, and installed the system.

International Energy Days

The Section participated on behalf of the Department in International Energy Days, a co-operative effort of the Conference of New England Governors and Eastern Canadian Premiers. The Town of Yarmouth represented the Province and received the Education Award for its participation in this biennial event.

Committee Memberships

Staff represented the Department on numerous committees, including the Ureaformaldehyde Task Force, the Maritime Energy Education Coordinating Committee of the Maritime Provinces Education Foundation, the Canadian General Standards Board (Standards for Insulation Contractors), and the Energy Technical Committee of the Roads and Transportation Association of Canada.

Promotional Services

The staff of the Section provided comprehensive information, printing, and advertising services to the Division. This took the form of about 30 press releases on Division activities, seminar promotion through brochures and advertising, numerous printing requisitions, and advertising for programs such as the Small Scale Energy Demonstration Grant Program, Ener$ave and Small Business Energy Analysis and Grant Program. The Section also coordinated extensive advertising and promotional campaigns under the Subsidiary Agreement.

Program Initiatives

Several major program initiatives were mounted by the Section in 1983 - 84 under the Canada - Nova Scotia Subsidiary Agreement on Energy conservation. A program promoting emission analysis and carburettor adjustment to improve fuel economy was undertaken with the joint sponsorship of the Automotive Service Managers Association.

Education

The Section also plays a lead role in providing public school energy education. Its cost-shared Energy Education program provided classroom presentations to more than 26,000 children in schools across Nova Scotia in fiscal year 1983 - 84. Requests for presentations exceeded the resources of the Program.

ENGINEERING SECTION

V. Munroe, P.Eng., Section Manager

INTRODUCTION

The Engineering Section is responsible for five major programs: Ener$ave, Pilot Projects, Cogeneration and Waste Heat Utilization Program, Energy Test and Information Centre (ENERTIC) Program, and the Small Business Energy Analysis and Grant Program. All five programs are funded under cost-shared agreements between Nova Scotia and Canada. The Section also does technical studies and monitors technological developments in the fields of energy management and renewable energy resources. The goal of all programs and activities of the Section is to reduce provincial energy use, particularly of petroleum products, and to increase the efficiency of energy use.

PROGRAMS

Ener$ave Program

On June 3, 1982, the Canada - Nova Scotia Agreement on Industrial Energy Conservation was signed. This Agreement replaced the former Ener$ave Agreement and provided for continuation of the Ener$ave Program and Consulting Follow-up Program to March 31, 1984.

The Ener$ave Program continued to provide energy audits, financial assistance to hire consultants, and energy conservation seminars to major

sectors of the provincial economy. From April 1, 1983, to March 31, 1984, 364 energy audits were completed on establishments with a combined annual energy bill of $17.4 million. Potential annual energy savings of $2.7 million were identified — an average of 15.6 per cent. A summary is provided in Table 6.

TABLE 6. EnerSave Program (1983 - 84 fiscal year)

	Industrial	Commercial	Institutional	Total
Audits	32	216	116	364
Total Energy Use	$4,578,700	$9,248,800	$3,574,700	$17,402,200
Average/Site	$ 143,080	$ 42,820	$ 30,820	$ 47,810
Potential Savings: Value	$ 384,000	$1,722,710	$ 608,260	$ 2,714,970
Percentage	8.4%	18.6%	17.0%	15.6%

Since the start-up of this program in 1977, nearly 2,000 facilities in Nova Scotia have been audited and a potential for annual energy savings of $21.4 million has been identified.

During the reporting period, EnerSave's Consulting Follow-up Program paid 118 grants worth $615,600 for energy conservation studies at industries, businesses, and institutions. These studies were undertaken following an energy audit to prepare a detailed program for implementation of energy conservation and management measures.

Pilot Projects Program

This program encourages the development, demonstration, and use of new energy conservation and renewable energy sources. The program provides financial and technical assistance for demonstration projects using innovative energy conservation and management technologies and those using any of the renewable energy sources. Financial participation is required of those proposing the project. The amount of assistance varies with the financial risk involved. The program's objective is to introduce new energy technologies to increase the use of renewable energy sources in Nova Scotia, thereby broadening the range of energy sources and energy technologies

used in the Province.

Between April 1, 1983, and March 31, 1984, 19 new projects were approved, resulting in program commitments of $1,514,770. Actual cash flow for the period was $1,319,340. Program activity is summarized in Table 7.

Several projects deserve special mention. In line with a project implemented last year to highlight energy conservation opportunities in schools, the program initiated similar projects with the Department of Recreation, Culture, and Fitness on recreational facilities and with the Department of Health on measures appropriate to hospitals.

Biomass energy of all renewable energy sources has the most significant potential in the short term to decrease Nova Scotia's dependence on imported oil. In 1983 - 84, two major industries, Avon Valley Greenhouses Limited and Britex Limited, were offered program assistance to convert to woodwastes and forest residues, respectively.

Energy audits were performed on 120 residences by contract employees trained under the Home Energy Analysis Trial (H.E.A.T.). The average level of saving identified was 36 per cent. In addition, 29 offers of assistance totalling about $38,400 were made to program participants for energy conservation work on their homes.

The Small Scale Energy Demonstration Program, funded under the Pilot Projects Program, was offered in summer/fall of 1983 for the fourth year. The program provides financial assistance, on a competitive basis, to individuals and groups to demonstrate small scale renewable energy and energy conservation technologies. Seventy-six projects were selected by a panel of independent judges from 231 proposals submitted. Assistance totalled $327,717 for projects. A summary of approved projects is provided in Table 8.

Cogeneration and Waste Heat Utilization Program

This Program's objectives are to identify the opportunities for cogeneration and waste heat recovery in Nova Scotia and to promote the use of these technologies through seminars, demonstrations, and grants for evaluations of specific sites.

In May 1983, a one-day seminar was conducted in Halifax. Nearly 100 participants were briefed on the latest technical information on waste heat recovery in steam plants and heat recovery from refrigeration equipment.

TABLE 7. Project Types for Pilot Projects Program

Project Type	No. of Projects	Program Commitment	Percent of Total
Energy Conservation			
Buildings	4	$ 163,870	11
Transportation	2	200,000	13
Waste Heat Utilization	2	190,000	12
Small Scale Demo Program	1	327,717	22
Renewable Biomass	3	403,781	27
Seminars & Info Transfer	7	229,400	15
TOTAL	19	$1,514,768	100%

TABLE 8. Approved Projects — Small Scale Energy Demonstration Program in the 1983 - 84 Fiscal Year

Technology	No. of Projects	Per Cent of Projects	Financial Assistance	Per Cent of Total
Attached Structures	16	22	$ 62,675	19
Solar Greenhouses	2	3	15,600	5
Solar Domestic Hot Water	15	20	36,475	11
Solar Space Heat	4	5	12,925	4
Wind Energy Systems	5	7	32,980	10
Heat Pumps	5	7	35,600	11
Heat Exchangers	6	8	8,400	3
Waste Heat Recovery	3	4	7,750	2
Hydro Systems	6	8	44,005	13
Major Thermal Retrofit	6	8	43,400	13
Photovoltaics	2	3	11,450	3
Biomass	1	1	4,540	1
Movable Window Insulation	5	7	11,917	4
TOTAL	76	100%	$327,717	100%

In November 1983, another one-day seminar was conducted on heat pipes, regenerative heat recovery systems, and the use of glass heat recovery systems. Sixty-six people attended.

During fiscal year 1983 - 84, 40 companies and institutions contracted for waste heat recovery feasibility and design studies involving assistance of $317,000.

ENERTIC

The Energy Test and Information Centre consists of two distinct operations: a solid fuel testing facility at the Technical University of Nova Scotia and an energy information resource centre at the Nova Scotia Research Foundation Corporation. Services are provided by the two organizations through contracts with the Department.

The information centre provides energy-related information to both the public and private sector. This service also encourages the development of technical innovation by carrying out preliminary evaluations of ideas and inventions. During the 1983 - 84 fiscal year, the number of inquiries handled by the information centre stabilized at an average of 20 per month, one inventor's idea was assessed, and 256 documents were added to the data base.

On the testing side, four wood burning furnaces were evaluated for efficiency and output on behalf of industry. In addition, a number of combustion research and development contracts requiring use of the flame tunnel facility have been carried out for industry and government. This work was done by the Centre for Energy Studies, Technical University of Nova Scotia, on behalf of ENERTIC.

Small Business Energy Analysis and Grant Program

This new program began providing services on September 15, 1983. Under this program, all companies with energy costs of under $10,000 annually may receive an on-site technical analysis aimed at identifying energy conservation measures, as well as financial assistance up to $5,000 to implement conservation measures.

As of March 31, 1984, 281 analyses had been completed and $255,000 of assistance from the program had been authorized to assist 88 businesses with implementation of conservation measures.

OTHER ACTIVITIES

The Engineering Section was involved in several other activities during the fiscal year. Staff performed inspections on 88 solar and 7 wind energy equipment projects on behalf of the Provincial Tax Commission under the sales tax rebate program.

The Section prepared about 25 project descriptions. About 50,000 of these descriptions have been printed and circulated.

Staff were involved in a number of seminars in fiscal year 1983 - 84. Ener$ave staff conducted seminars on energy conservation programs and Pilot Projects Program staff conducted seminars on energy generation from combustible waste and on the efficient use of electricity. These seminars were well attended. In addition, staff made about 20 presentations to various groups on programs and projects assisted and undertaken by the Section.

Section staff participated on steering committees for a number of studies and reports. A major report, *Forest Residue Wood Chip Substitution Study,* was completed in fiscal year 1983 - 84. This report has been summarized and will be distributed to all persons interested in the study.

ADMINISTRATION DIVISION

C.R. James, R.I.A., Director

The Administration Division provides the Department with financial, operational, and personnel management. It also provides cartographic and administrative services to the Department and accounting services for Novaco Limited. The Director is Secretary-Treasurer of this Crown Corporation.

Under the Departmental Budgetary System, the Administration Division consists of the Office of the Minister and Deputy, Energy Administration, Mines and Minerals Administration, and the Administration Division.

The duties and functions of the Division are divided into four sections: Accounting Services, Mineral Taxation and Fiscal Planning, Personnel and Administration, and Cartography.

The Administration Division is responsible for resource revenue policy, the collection of royalties and mineral taxes, and for management and evaluation of government funded coal mine and coal miner assistance programs. Studies have been commissioned to renew the various mines/miner assistance programs.

The royalty section of the Mineral Resources Act was amended to allow a mining corporation to depreciate assets more rapidly during early years of production.

A records management study for the Department was initiated during the year. This program, upon completion, will increase our capability of storing and retrieving departmental data.

Mineral Taxation and Fiscal Planning Section

Blair McMullin, Section Manager

The Mineral Taxation and Fiscal Planning Section is responsible for resource revenue policy and administration of mineral royalty and tax legislation, the Departmental Budget and Control, and the Coal Mine/Miner Financial Assistance Programs.

The Section also provides accounting services for Novaco Limited, a provincial crown corporation.

MINERAL ROYALTIES AND TAXES

This section proposes legislative amendments and manages the royalty and tax provisions of the Mineral Resources and Gypsum Mining Income Tax Acts. The royalties and taxes collected during the 1983 - 84 fiscal year are shown in Table 9.

TABLE 9. Royalties and taxes for the fiscal year ended March 31, 1984.

Commodities	Amount
Gypsum	$ 723,700.37
Coal	841,638.19
Salt	154,989.17
Other	22,636.09
TOTAL	$1,742,963.82

During the year the National Committee of Mine Assessors met to discuss various issues common to all provinces in the nonrenewable resource sector. Also, during the year, a royalty section of the Mineral Resources Act was amended by Legislature to permit the acceleration of depreciation of a mining company's assets for its reporting of royalties.

The revenue from royalties and taxes reported by the Department are shown for a 20 year period in Figure 15.

The increase in revenue in 1975 coincided with the passage of the Mineral Resources Act of 1975 and the change in the royalty and tax regulations.

DEPARTMENT BUDGET AND CONTROL

As the Budget Team leader the Section manager is responsible for coordinating the departmental budget process.

During the year accounting subcodes were implemented in the departmental budgeting system to provide greater detail on departmental funding requirements. Also, the forecast system designed by the Accounting Services Section, was implemented to more closely tie quarterly expenditures to the approved estimate. The data provided by these reports are processed for the information of the senior management.

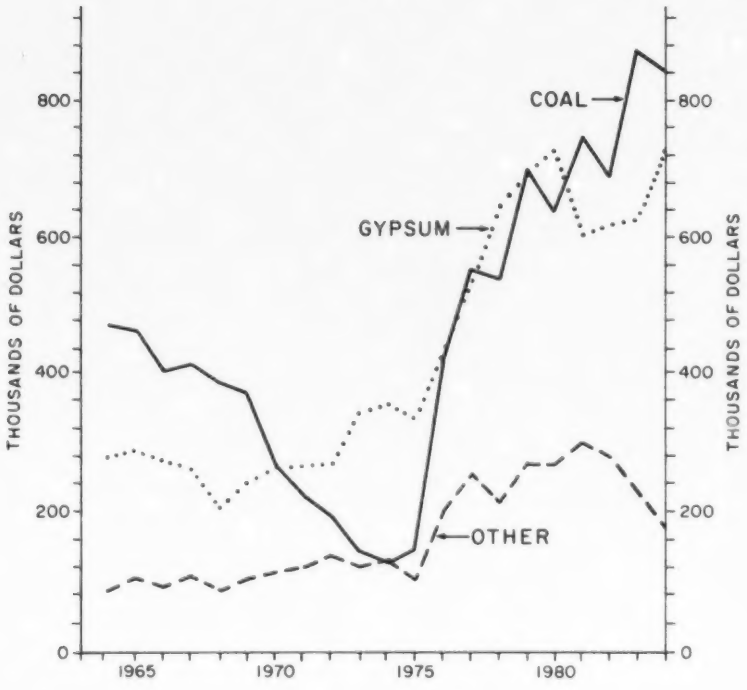

Figure 15. Historical review of royalties and taxes

MINE/MINER FINANCIAL ASSISTANCE PROGRAMS

Three financial programs are administered by the section: Independent Coal Mines Subsidy Program, the Coal Miners' Pre-Retirement Leave Program and the DOSCO 1923 Pension Program.

The Independent Coal Mines Subsidy Program has been in effect since 1968. The Program provides financial assistance to the participating coal mine operations giving a measure of economic stability to communities heavily dependent upon the industry.

During the year, subsidies in excess of $850,000 were granted to the two remaining coal operations participating in the plan: Evans Coal Mines of Inverness, Inverness County, and Drummond Coal Company, now Pioneer Coal Limited of Westville, Pictou County.

The Section, on behalf of Novaco Limited and with the aid of the Accounting Services staff, administers the Coal Miners' Pre-Retirement Leave and DOSCO 1923 Pension Program. The Coal Miners' Pre-Retirement Leave Program is designed to alleviate the hardships of employees who are forced to leave the mine work force due to a cutback in production or mine closure.

The DOSCO 1923 Pension Program is payable to eligible former employees of Acadia Coal Company Limited who retired by December 31, 1976. During the past year a study was conducted on the Pre-Retirement Leave Program. This report, based upon a field review, will provide a sound information base for the future. Also the Department of Mines and Energy has taken steps to transfer the administration of these programs from Novaco Limited to the Department.

Fifty-four recipients receive pensions and 104 receive pre-retirement benefits accounting for a total expenditure of more than $475,000 granted during the year.

Accounting Services Section

Ken Faulkner, R.I.A., Section Manager

The Accounting Services Section provides managerial and financial accounting and performs statistical services for the Department.

The Section is responsible for maintaining and updating the computerized departmental accounting system which provides internal control by recording, reporting and reconciling expenditures with Department of Finance information. This also includes revenue and recoveries received by the Department.

Also during this year, a quarterly expenditure and forecast turn-around reporting system was introduced to help management maintain budgetary control of expenditures. A number of forms were revised: for example, Departmental Purchase Order, Departmental Invoices and Authorization for Out of Province Travel.

During the fiscal year an accountant was hired whose prime area of responsibility is to assist management in the financial administration of the numerous federal/provincial agreements.

Cartographic Services Section

D.H. Bernasconi, Section Manager

The provision of both drafting and photographic services for all divisions of the Department is the major responsibility of the Cartographic Section. In the past year, most of the material produced by the drafting unit was related to geological studies and energy programs for inclusion in various publications.

This component also produces and maintains approximately 300 mining claim maps for plotting areas held under the Mineral Resources Act and the Petroleum and Natural Gas Act.

The photographic unit reproduces material for publication purposes, provides photographs for display purposes, undertakes various field photography assignments, furnishes slides for audio-visual presentations, and is in the process of editing and cataloguing a comprehensive collection of slides related to the mineral resources of the Province.

Personnel and Administration Section

P. Edwards, Section Manager

This Section provides advice and support on personnel management to all divisions of the Department. The responsibilities of the Section include staffing programs, labour-management issues, establishment and maintenance of performance appraisal systems, career development training, personnel and payroll documentation, and the maintenance of employee records. The Section is also responsible for the continual upgrading of office and administrative services for the Department.

The first phase of an approved Records Management Program was begun by the Supervisor of Office Services with the assistance of the Provincial Records Manager and Management Board. The program is a result of a province-wide records management study.

Also, changes have been made to the system of coding and recording furniture and equipment. These changes have improved the inventory control and reporting procedures.

During the year the Section provided support in recruiting a number of staff in the energy conservation and mining areas.

Throughout the year staff attended various inservice and external courses and programs covering areas of management and supervisory development, communication skills, clerical/secretarial development and occupational health and safety.

With the announcement of a Provincial Winter Employment Program, approximately 25 people were hired during the winter months. Our university student recruitment program also provided summer employment for approximately 50 students.

The changes in personnel during the 1983 - 84 fiscal year are shown in Table 10.

TABLE 10. Personnel changes during the 1983 - 84 fiscal year.

Appointments	**Resignations**
John Campbell	Wayne Bassani
Stan Chesal	John French
David Davies	David MacAskil
Colette Deschenes	Valery Penny
Michael Duda	Verne Powell
John Fraser	Judith Watt
Walter Fell	Claude White
James Hamilton	
Patrick Hannon	**Retirements**
Peter Healy	
James MacDonald	Eva Duncan
Bruce MacNeil	Samuel Wareham
Scott McCoombs	
Scott McKellar	
Peter Melynk	
Robert Naylor	
Cynthia Phillips	
Karen Reid	
Joan Shatford	
Judith Watt	

FINANCIAL INFORMATION

The Department of Mines and Energy employed approximately 160 people in 1983 - 84. During that time, the Department administered expenditures of $48,747,916 while recovering $4,522,901 from various funds. Royalties and mining taxes as reported in Table 10 were $1,742,964 and other fees were $330,612 for total Revenue of $2,073,576.

Expenditure information is presented under three headings. "OPERATIONS" and "ASSISTANCE" are budgeted in the Department. "OTHER" includes expenditures budgeted under a Public Service Vote and in the Department of Development.

"OPERATIONS" information is presented by budget subject title by division.

"ASSISTANCE" information is presented by budget subject title under two sectors, Coal Industry and Energy.

"OTHER" is presented by the legislative vote title or the department where the funds have been budgeted.

As the expenditure information provided was drawn from the publications *Estimates of the Government of Nova Scotia* and *Public Accounts of the Province of Nova Scotia*, the subject titles may differ from the sectional titles drawn from the department's organization (Fig. 1).

OPERATIONS

Division Activity Budget Subject Title	Actual Expenditure 1982 - 83	Estimate 1983 - 84	Actual Expenditure 1983 - 84
ENERGY MANAGEMENT DIVISION			
1. Energy Statistics	$ 41,152	$ 49,200	$ 39,929
2. Ener$ave Program	797,764	1,139,600	1,045,899
3. Energy Planning	233,967	358,700	141,558
4. Public Programs and Promotion	159,794	218,100	196,405
5. Energy Engineering	121,364	129,000	106,379
6. Energy Publications	26,160	67,100	13,808
Total Energy Management Division	$1,380,201	$1,961,700	$1,543,978

Division Activity Budget Subject Title	Actual Expenditure 1982 - 83	Estimate 1983 - 84	Actual Expenditure 1983 - 84
ADMINISTRATION DIVISION			
1. Office of the Minister and Deputy Minister	$ 333,873	$ 352,800	$ 308,808
2. Energy Branch Administration	198,598	178,600	164,792
3. Mines and Minerals Branch Administration	225,431	258,400	284,989
4. Accounting, Personnel and Administration	270,650	267,200	255,117
5. Clerical Support Services	253,725	318,300	320,335
6. Cartographic Services	217,339	244,700	240,468
Total Administration Division	$1,499,616	$1,620,000	$1,574,509
MINERAL RESOURCES DIVISION			
1. Mineral Resource Evaluations	$148,242	$ 91,000	$ 89,899
2. Regional Surveys	294,716	262,300	250,196
Total Mineral Resources Division	$442,958	$ 353,300	$340,095
MINING ENGINEERING DIVISION			
1. Mining Engineering	$101,748	$ 184,100	$116,706
2. Mine Safety and Inspection	354,078	427,900	401,434
Total Mining Engineering Division	$455,826	612,000	$518,140
DRILL AND MECHANICAL DIVISION			
1. Drilling Services	$358,279	$ 358,800	$450,277
2. Support Services	243,689	275,500	260,300
Total Drill and Mechanical Division	$601,968	$ 634,300	$710,577

Division Activity Budget Subject Title	Actual Expenditure 1982 - 83	Estimate 1983 - 84	Actual Expenditure 1983 - 84
ENERGY RESOURCES DIVISION			
1. Petroleum Resources	$267,490	$ 430,600	$484,703
2. Coal Exploration	294,077	314,800	224,277
3. Peatlands Inventory	113,899	123,200	112,454
4. Coal Development and Utilization	70,366	136,000	95,991
Total Energy Resources Division	$745,832	$1,004,600	$917,425
MINERAL DEVELOPMENT DIVISION			
1. Mineral Development	$ 172,046	$ 197,000	$ 175,497
2. Exploration Monitoring	175,664	189,500	166,701
3. Library Services	116,079	190,900	192,172
Total Mineral Development Division	$ 463,789	$ 577,400	$ 534,370
Total Operations	$5,590,190	$6,763,300	$6,139,094
ASSISTANCE PROGRAMS			
COAL INDUSTRY ASSISTANCE			
1. Coal Miners' Assistance	$ 428,433	$ 510,000	$ 473,814
2. Coal Development — Novaco	221,979	60,000	60,000
3. Coal Mines Subsidy	818,585	685,000	954,842
4. Coal Reclamation Project	1,748,064	93,700	147,026
Total Coal Industry Assistance	$ 3,217,061	$1,348,700	$1,635,682

Division Activity Budget Subject Title	Actual Expenditure 1982 - 83	Estimate 1983 - 84	Actual Expenditure 1983 - 84
ENERGY ASSISTANCE			
1. Coal Liquifaction	$ 193,642	$ 234,400	$ 232,177
2. Power Rate Assistance	24,256,965	-	-
3. Oil Substitution	1,708,798	1,500,000	779,896
Total Energy Assistance	$26,159,405	$1,734,400	$1,012,073
Total Assistance	$29,376,466	$3,083,100	$2,647,755
OTHER PROGRAMS			
OTHER			
1. Power Rate Assistance Budgeted as a Public Service Vote	- - - -	$25,000,000	$36,470,403
2. Energy and Mineral Subsidy Agreements Budgeted in Department of Development	$ 3,728,411	4,092,000	3,490,664
Total Other	$ 3,728,411	$29,092,000	$39,961,067
TOTAL EXPENDITURES ADMINISTERED BY DEPARTMENT OF MINES AND ENERGY	$38,695,067	38,938,400	$48,747,916

LEGISLATION

INTRODUCTION

The Nova Scotia Department of Mines and Energy receives its legislative mandate from the Public Service Act. This Act provides for a Department of Mines and Energy and appointment of a Deputy Minister. Further, it designates certain basic legislation and certain functions involved with energy and mineral issues for administration by the Department.

Seven Acts are administered by the Department or affect its operation.

Mineral Resources Act (replaces Mines Act)

The Mineral Resources Act governs the disposition of mineral rights for exploration and development, administrative procedures, resource management requirements, and royalties. Stone, sand, gravel, peat, soil, some gypsum and limestone, oil, natural gas, and oil shale are not currently considered "minerals" under this Act.

Coal, uranium, salt, and potash were withdrawn from application under Exploration Licences as of June 1, 1975. Special licences may be granted for work involving these minerals by Governor-in-Council (Mk 1008).

Petroleum and Natural Gas Act

The Petroleum and Natural Gas Act governs disposition of mineral rights for petroleum and natural gas exploration both onshore and offshore.

Gas Storage Exploration Act

The Gas Storage Exploration Act governs the exploration and development of underground storage of liquid or gaseous petroleum products.

Treasure Trove Act

The Treasure Trove Act governs the exploration for precious stones and metals in a state other than their natural state. Terms and conditions of licence and royalty requirements are prescribed by the Governor-in-Council.

Coal Mines Regulation Act

The Coal Mines Regulation Act governs operation and safety in coal mines.

Cape Breton Development Corporation mines are not covered by the Act because the Canada Department of Labour inspects federal crown corporations.

Metalliferous Mines and Quarries Regulation Act

The Metalliferous Mines and Quarries Regulation Act governs operation and safety in metalliferous mines (i.e. mines not covered by Coal Mines Regulations Act) and quarries (except quarries operated by the Department of Transportation).

Gypsum Mining Income Tax Act

The Gypsum Mining Income Tax Act establishes reporting procedures and rates of income tax on gypsum mining operations.

An Act to Confer Certain Powers Upon the Lieutenant Governor-in-Council and to Amend the Mines Act

Certain powers are conferred on the Lieutenant Governor-in-Council for purposes of maintaining an acceptable level of stability in the Coal Mining Industry. This Act provides authority for a subvention program for independent coal mine operators (OIC 73-78), preretirement leave program (OIC 77-574), coal waste dumps reclamation project (OIC 73-574), and establishment of Novaco (OIC 78-265).

APPENDIX A
PUBLICATIONS FOR FISCAL YEAR 1983-84

MINES AND MINERALS BRANCH

Paper 82-2: Metasomatic-Hydrothermal Mineral Deposits of the New Ross - Mahone Bay Area, Nova Scotia, by G.A. O'Reilly, E.J. Farley and M.H. Charest.
Price: Hardcopy $5.00, Microfiche $1.50.

Report 82-6: Drilling Logs of Government Core Drills, 1981, compiled by I. MacDougall and D.E. Polley.
Price: Hardcopy $3.50, Microfiche $1.50.

Report 83-1: Mines and Minerals Branch, Report of Activities, 1982.
Price: Hardcopy $10.00, Microfiche $3.50.

Report 83-2: Index to Assessment Reports 1982 (with Keyword Index), by N.A. Lyttle and J. Gillespie-Wood.
Price: Hardcopy $3.00, Microfiche $2.00.

Report 83-3: Drilling Logs of Government Core Drills, 1982, compiled by I. MacDougall and D.E. Polley.
Price: Hardcopy $3.50, Microfiche $2.00.

Info. Series No. 6: Seventh Annual Open House and Review of Activities, November 30 and December 1, 1983, Program and Summaries.
Price: Microfiche only $2.00.

The Canadian Institute of Mining and Metallurgy Geology Division Excursion Guidebook **Gold Deposits in the Meguma Terrane of Nova Scotia**, October 17-21, 1983 by J.D. Keppie, S.J. Haynes, J.R. Henderson, P.K. Smith, B.H. O'Brien, M. Zentilli, L.R. Jensen, I.J. MacEachern, R. Stea, P. Rogers, 104 p.

Published by CIM. May only be ordered through CIM, Suite 400, 1130 Sherbrooke St. West, Montreal, Quebec, H3A 2M8. May be viewed in the libraries of the Halifax and Stellarton offices of the Nova Scotia Department of Mines and Energy.
Price: CIM Members $10.00; nonmembers $12.00; students $8.00. Plus $2.00 for postage and handling.

Reprint 83-1: A multivariate Approach to Geochemical Distinction Between Tin-specialized and Uranium-specialized Granites of Southern Nova Scotia, by A.K. Chatterjee, D.F. Strong, and G.K. Muecke. Reprinted from Canadian Journal of Earth Sciences, 20, 1983.
Price: Hardcopy $1.50, Microfiche $1.00.

Reprint 83-2: Uranium and Thorium in Paleozoic Rhyolites of Nova Scotia, by J. Dostal, C. Dupuy, and J.D. Keppie. Reprinted from Canadian Journal of Earth Sciences, 20, No. 2, 1983.
Price: Hardcopy $1.50, Microfiche $1.00.

Map 83-1: Geological Map of the Hantsport Area, Nova Scotia, compilation and geology, by S.A. Ferguson, scale 1:25,000.
Price: $5.00.

Map 83-2: Calculated Vertical Magnetic Gradient Map of the Cape Breton Highlands, Inverness, and Victoria Counties, Nova Scotia, scale 1:125,000.
Price: $5.00.

Map 83-4: Geological Map of the Red River Anorthosite Complex, Inverness and Victoria Counties, Nova Scotia, by P.K. Smith and S.A. MacDonald, scale 1:125,000.
Price: $1.50.

ENERGY BRANCH

1983 Energy Statistical Profile. (ISSN. 0821-6959). Price: $3.00.

Nova Scotia Energy Supply and Demand 1983 - 2005. Free.

Renewable Energy in Nova Scotia 1983. (ISBN 0-88871-043-7) Price: $5.00.

Energy Conservation for Individuals, A Guide to Government Programs. Free.

Energy Program Guide for Business, Industry and Institutions. Free.

Home Heating Workbook. Free.

How to Weatherstrip and Caulk Your Home. Free.

Controlling Condensation in the Home. Free.

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The Sun Book (ISBN 0-88871-003-8). Price: $3.50 for out-of-province requests.

The Wood Book (ISBN 0-88871-002). Price: $1.50 for out-of-province requests.

Wind Power (ISBN 0-88871-008-9). Price: $2.50 for out-of-province requests.

Oil and Gas Exploration in Nova Scotia, 1983 - 84, Price: $2.00.

APPENDIX B

PRODUCTION INFORMATION FROM MINES, QUARRIES, AND OTHER OPERATIONS

In this appendix the production of each commodity is described and located. Tables B-1 to B-4 summarize the production figures for each commodity or mineral. Locations of operations are shown on the accompanying Figures B-1 to B-4. Production data are for the calendar year (January 1, 1983 to December 31, 1983).

The mining industry in Nova Scotia employed approximately 6542 people in the calendar year 1983. The total value of the commodities produced was $290,678,584.

BASE METAL AND GOLD MINES

There was no base metal or gold production in 1983, although there is continued interest in the possibilities of reactivating several of the old gold mines.

At the East Kemptville tin prospect Rio Algom Ltd. is developing the site after thoroughly examining all geological and engineering data. The proposed mine is expected to begin production during the Autumn of 1985.

COAL MINING OPERATIONS

In 1983, there were five underground coal mines, two open-pit coal mines and two coal dump reclamation plants. Table B-1 summarizes production information. The location of the operations is shown in Figure B-1.

Underground Coal Mines

DRUMMOND COAL COMPANY LTD.

Manager:	G. Dooley
Address:	P.O. Box 929, Westville, Nova Scotia B0K 2A0
Production:	13,902 tons (12 638 t) coal
Employees:	40

The Drummond No. 2 mine is located near the Town of Westville, Nova Scotia. The output of the Drummond Mine is gained by the room and pillar method of mining. The coal is cut, shot, and hand-loaded into mine cars at the coal face. The mine cars are then hauled to the main holding bottom and hoisted via the main slope to the surface.

EVANS COAL MINES LTD.

Manager:	G. Evans
Address:	R.R. #1, Inverness, Nova Scotia B0E 1N0
Production:	47,892 tons (43 538 t) coal
Employees:	53

The St. Rose Colliery, Inverness County, is owned and operated by Evans Coal Mines Ltd. The entire output is produced by the room and pillar system of mining with the use of slushers. The coal is then transported to the haulage level by chain conveyor, loaded into one-ton mine cars, and hoisted to surface in the main slope.

CAPE BRETON DEVELOPMENT CORPORATION

Manager: (Coal Production)	D. Shield, Vice President, Mining Operations
Address:	P.O. Box 2500, Sydney, Nova Scotia B1P 6K9
Lingan Mine:	Lingan
No. 26 Colliery:	Glace Bay
Prince Mine:	Point Aconi
Donkin/Morien:	Donkin (Development)
Production:	3,034,699 tons (2 758 817 t) coal
Employees:	4450

The Cape Breton Development Corporation (CBDC), a federal Crown corporation, operates three producing coal mines and another which is under development. Lingan and No. 26 collieries recover the coal by fully mechanized longwalls. The Prince Mine uses mechanized shortwalls. Donkin Mine is still in the development stage with the main slopes being driven seaward to intersect the coal seams.

Open-Pit Coal Mines

NOVACO LTD.

Manager:	C. White
Address:	P.O. Box 147, Sydney Mines, Nova Scotia B1V 1Y3
Production:	236,456 tons (214 969 t) coal
Employees:	23

The Point Aconi open-pit mine is owned by Novaco but the actual mining is done under contract by Nova Construction Company of Antigonish. The overburden is drilled, blasted, and removed by a dragline excavator. The exposed coal seam is loaded into trucks with a small shovel.

Production has ceased at the small open-pit mine at Springhill with the exhaustion of the open pitable reserves. Proposals have been solicited from industry to establish an underground mine starting at the high wall of the open pit.

T. BROGAN & SONS CONSTRUCTION LTD.

Manager:	T. Brogan
Address:	P.O. Box 199, Florence, Cape Breton B0C 1J0
Production:	33,901 tons (30 819 t) coal
Employees:	10

A strip mine is operated at Point Aconi, Cape Breton. The overburden is removed by dragline excavator and the exposed coal is ripped with a bulldozer and loaded into trucks with a front-end loader.

Coal Reclamation Plants

SELMINCO INC.

Manager:	D. Frederickson
Address:	P.O. Box 189, New Waterford, Nova Scotia B1H 4N9
Production:	133,319 tons (12 199 t) reclaimed coal
Employees:	60

The company operates two reclamation plants, one working on the Prince Mine Dump at Sydney Mines, the other is operating on the dump at Scotstown, near New Waterford.

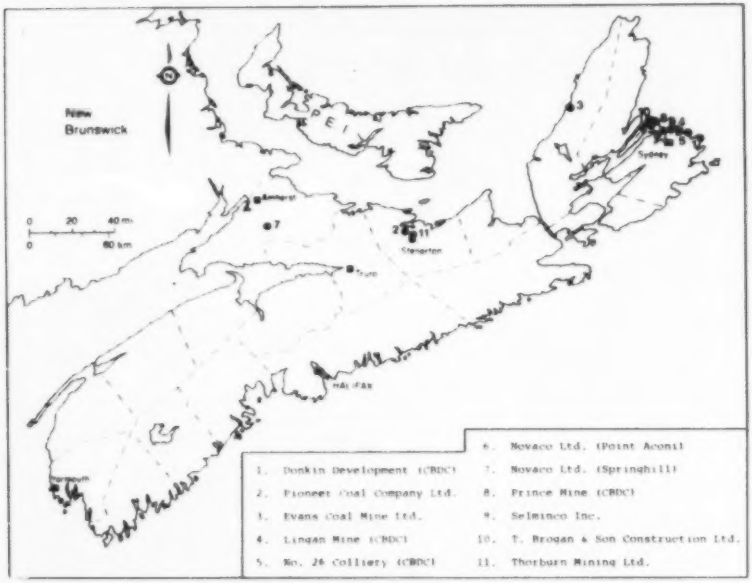
TABLE B-1. Coal Production, 1983

COMPANY	MINE NAME	LOCATION	PRODUCTION (saleable coal) (tons)	(tonnes)	TOTAL NUMBER EMPLOYED	APPROXIMATE VALUE[3]
Underground Mining						
Cape Breton Development Corp. (CBDC)	Prince Mine No. 26 Colliery Lingan Mine	Point Aconi, Cape Breton County Glace Bay, Cape Breton County Lingan, Cape Breton County	3,034,699[2]	2 758 817[2]	4,450	
Evans Coal Mines Ltd.		St. Rose, Inverness County	47,892	43 538	53	
Drummond Coal Co.		Westville, Pictou County	13,902	12 638	40	
		Total (underground)	3,096,492	2 814 993	4,543	
Open Pit Mining						
T. Brogan Ltd.		Point Aconi, Cape Breton County	33,901	30 819	10	
Novaco		Point Aconi, Cape Breton County Springhill, Cumberland County	236,456	214 969	23	
		Total (open pit)	270,357	245 779	33	

TABLE B-1. Continued.

COMPANY	MINE NAME	LOCATION	PRODUCTION (saleable coal) (tons)	(tonnes)	TOTAL - NUMBER EMPLOYED	APPROXIMATE VALUE[3]
Reclamation						
Selminco Inc.		Sydney Mines, Cape Breton County	133,319	121 199	60	
		Total (reclamation)	133,319	121 199	60	
		Total for all Coal Producers	3,500,168	3 181 971	4,636	$167,377,000[3]

[1]personnel employed in clerical, supervisory, etc positions as well as mining personnel
[2]washed coal
[3]estimated from Nova Scotia Department of Mines and Energy sources



B-1. Location of coal mining operations

INDUSTRIAL MINERALS

Industrial minerals form a significant part of the total mineral production in Nova Scotia. Fourteen quarries or mines produce gypsum, salt, anhydrite, limestone, barite, and dolomite. The locations of these mines or quarries is shown on Figure B-2. Table B-2 summarizes production information.

Gypsum and Anhydrite

CANADA CEMENT LAFARGE LTD.

Manager:	D. King
Address:	P.O. Box 5, Brookfield, Nova Scotia B0N 1C0
Production:	4,991 tons (4 537 t) gypsum
Employees:	12

A small quarry was opened in 1983 to supply the internal requirements of the cement plant at Brookfield. It is only operated on an intermittent basis.

DOMTAR CONSTRUCTION MATERIALS LTD.

Manager:	S.G. Johnson
Address:	P.O. Box 758, Windsor, Nova Scotia B0N 2T0
Production:	8,903 tons (8 094 t) gypsum
Employees:	12

Domtar Construction Ltd. operates a small gypsum quarry at MacKay Settlement. The actual quarry operation is done under contract by D. MacDonald. Domtar is the only gypsum operation in the Province that undertakes any processing of the crude gypsum. The gypsum produced is calcined.

FUNDY GYPSUM CO. LTD.

Manager:	G. Raymond
Address:	P.O. Box 400, Windsor, Nova Scotia B0N 2T0
Production:	76,403 tons (69 457 t) anhydrite
	1,437,540 tons (1 306 855 t) gypsum
Employees:	161

The Fundy Gypsum Co. Ltd. quarries and crushing plants are located in the Wentworth and Miller Creek areas near Windsor, Nova Scotia. After selective quarrying, the materials are crushed and transported via unit train to shiploading facilities at Hantsport for shipment to wallboard manufacturing plants in the United States. Two quarries are in operation: Wentworth, which produces anhydrite and gypsum, and Miller Creek which produces gypsum only.

GEORGIA PACIFIC CORPORATION

Manager:	J. Graham
Address:	P.O. Box 400, Port Hawkesbury, Nova Scotia B0E 2V0
Production:	827,511 tons (752 283 t) gypsum
Employees:	41

The quarry is situated at River Denys, Inverness County. The gypsum is transported by rail to shiploading facilities at Port Hastings. At the quarry the overburden is stripped by a dragline excavator and the gypsum is recovered by shovel and truck.

LITTLE NARROWS GYPSUM COMPANY LTD.

Manager:	T.H. Davis
Address:	Little Narrows, Nova Scotia B0E 1T0
Production:	43,285 tons (39 350 t) anhydrite
	815,995 tons (741 814 t) gypsum

Employees: 76

The company operates a gypsum and anhydrite quarry at Little Narrows with shiploading facilities on the Bras d'Or Lake. This is the oldest gypsum quarry operating in the Province; it started in 1936.

NATIONAL GYPSUM (CANADA) LTD.

Manager:	J.R. Cameron
Address:	P.O. Box 637, Dartmouth, Nova Scotia B2Y 3Y9
Production:	2,853,882 tons (2 594 438 t) gypsum
Employees:	111

National Gypsum operates the largest gypsum quarry in the Province at East Milford and a shiploading facility at Wrights Cove, Dartmouth. Unit trains transport the gypsum from the quarry to the dockside where it is shipped to east coast United States markets.

Salt

CANADIAN SALT CO. LTD.

Manager:	J. William McCormick
Address:	P.O. Box 160, Pugwash, Nova Scotia B0K 1L0
Production:	726,440 tons (660 400 t) salt
Employees:	205

The Pugwash Mine is located in the Village of Pugwash, Nova Scotia. A room and pillar system of extraction is employed utilizing trackless diesel equipment. In this system of extraction the working faces are first undercut and then blasted and loaded by front-end loaders onto trucks for transportation to a central underground crushing station. Once crushed, the salt is then skip-hoisted and fed to the processing plant on surface. This plant produces industrial grades, blocks for farm use, and refined salt for domestic consumption. The industrial grades are either supplied in bulk for truck transportation, bagged for rail transportation, or transported in bulk or bag to storage and shiploading facilities at the Pugwash Harbour wharf.

DOMTAR CHEMICALS GROUP — SIFTO SALT DIVISION

Manager:	R.E. Simmie
Address:	P.O. Box 550, Amherst, Nova Scotia B4H 4A1
Production:	70,780 tons (64 345 t) salt
Employees:	85

Domtar Chemicals Group, Sifto Salt Division, operates a solution salt mine located near Nappan, Cumberland County. The mining procedure involves the drilling of a borehole into the underground salt deposit. Water is pumped down to the deposit where it dissolves the salt, forming brine. The brine is then forced back to the surface where the salt is extracted using the "vacuum pan" process.

Barite

NYSTONE CHEMICALS LTD.

Manager:	J. Prostack
Address:	P.O. Box 64, Debert, Nova Scotia B0M 1G0
Production:	9,095 tons (8 268 t) ore mined
	657 tons (597 t) barite concentrate
Employees:	27

The ore is mined using open-pit methods by a contractor who transports it. The ore is then shipped to the Debert Air Industrial Park for treatment in the company-owned mill. The barite concentrate is leached and ground to a fine powder and is sold for pharmaceutical use.

NOVEX MINING AND EXPLORATION LTD.

Manager:	B. Coffin
Address:	East Bay, Cape Breton, Nova Scotia
Production:	14,598 tons (13 271 t) ore mined
	1,356 tons (1 233 t) barite concentrate
Employees:	22

This is the first year of production of barite from this property. The ore is extracted by open-pit mining under contract at Pine Brook and transported by road for processing at the mill at Enon, Cape Breton County.

MAGCOBAR DIVISION, DRESSER CANADA

Manager:	J. Hesketh
Address:	75 Ackerly Blvd., Burnside Industrial Park, Dartmouth, N.S.
Production:	1,540 tons (1 400 t) ore mined
Employees:	4

The barite is mined using open-pit methods with available local labour and equipment. The ore is ground and packaged by a contractor and stored at Walton, Hants County.

Limestone and Dolomite

CANADA CEMENT LAFARGE LTD.

Manager:	D. King
Address:	P.O. Box 5, Brookfield, Nova Scotia B0N 1C0
Production:	331,978 tons (301 798 t) limestone
Employees:	114

Canada Cement Lafarge Ltd. operates a limestone quarry at Brookfield, Colchester County, where the total production from the quarry is processed by an on-site cement manufacturing plant, owned and operated by the Company.

MOSHER LIMESTONE LTD.

Manager:	R. Mosher
Address:	P.O. Box 28, Upper Musquodoboit, N.S. B0N 2M0
Production:	103,590 tons (94 173 t) limestone
Employees:	36

Mosher Limestone operates two quarries on a rotating basis in the Upper Musquodoboit area of Halifax County and produces an agricultural grade dolomite/limestone. The product, when processed, is supplied in bulk or bagged for wide distribution throughout the Atlantic Provinces as fertilizer and soil conditioners.

RIDGE BROKERS LTD.

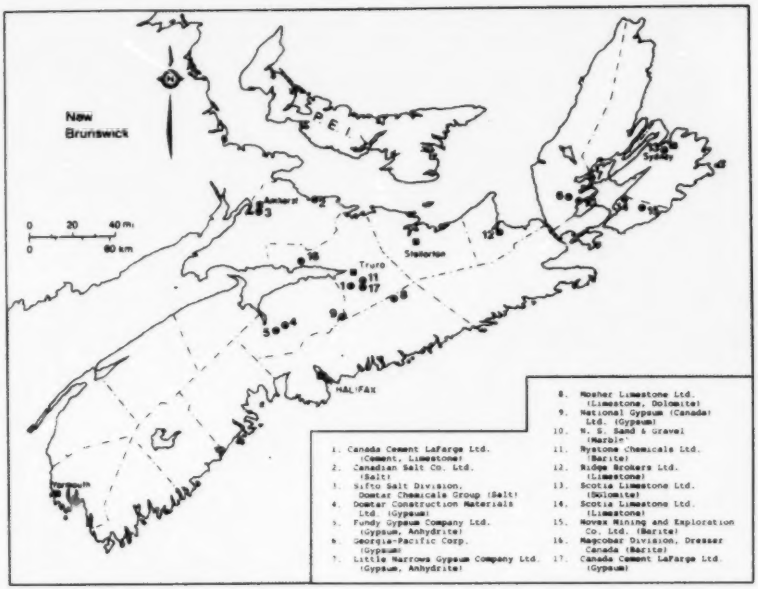
Manager:	J.L. Murray
Address:	P.O. Box 59, Havelock, New Brunswick E0A 1W0
Production:	13,750 tons (12 500 t) limestone
Employees:	3

The company operates a small quarry at South Side, Antigonish Harbour.

SCOTIA LIMESTONE LTD.

Manager:	L.P. Kent
Address:	P.O. Box 457, Sydney, Nova Scotia B1P 6H4
Production:	55,000 tons (50 000 t) dolomite and limestone
Employees:	35

With the depletion of the stockpile the quarry at Irish Cove reopened in 1983.


New Brunswick
PEI
Sydney
Amherst
Truro
Stellarton
HALIFAX
Yarmouth
0 20 40 mi
0 60 km
1. Canada Cement LaFarge Ltd. (Cement, Limestone)
2. Canadian Salt Co. Ltd. (Salt)
3. Sifto Salt Division, Domtar Chemicals Group (Salt)
4. Domtar Construction Materials Ltd. (Gypsum)
5. Fundy Gypsum Company Ltd. (Gypsum, Anhydrite)
6. Georgia-Pacific Corp. (Gypsum)
7. Little Narrows Gypsum Company Ltd. (Gypsum, Anhydrite)
8. Mosher Limestone Ltd. (Limestone, Dolomite)
9. National Gypsum (Canada) Ltd. (Gypsum)
10. N. S. Sand & Gravel (Marble)
11. Nystone Chemicals Ltd. (Barite)
12. Ridge Brokers Ltd. (Limestone)
13. Scotia Limestone Ltd. (Dolomite)
14. Scotia Limestone Ltd. (Limestone)
15. Novex Mining and Exploration Co. Ltd. (Barite)
16. Magcobar Division, Dresser Canada (Barite)
17. Canada Cement LaFarge Ltd. (Gypsum)

B-2. Location of industrial minerals operations

TABLE B-2. Industrial minerals production, 1983

COMPANY	LOCATION	PRODUCTION (tons)	PRODUCTION (tonnes)	TOTAL[1] NUMBER EMPLOYED	APPROXIMATE VALUE[2]
Gypsum					
Fundy Gypsum Co. Ltd.	Miller Creek, and Wentworth Hants County	1,437,540	1 306 855	161	
Little Narrows Gypsum Co.	Little Narrows, Victoria County	815,995	741 814	76	
Domtar Construction Materials Ltd.	Windsor, Hants County	8,903	8 094	12	
National Gypsum (Canada) Ltd.	Milford, Halifax County	2,853,882	2 594 438	111	
Georgia Pacific Corp.	River Denys, Inverness County	827,511	752 283	41	
Canada Cement Lafarge, Ltd.	Upper Brookfield, Colchester County	4,991	4 537	see limestone	
	Total (gypsum)	5,948,823	5 408 021	401	$37,097,027
Anhydrite					
Fundy Gypsum Co. Ltd.	Miller Creek, and Wentworth Creek, Hants County	76,403	69 457	included in	
Little Narrows Gypsum Co. Ltd.	Little Narrows, Victoria County	43,285	39 350	gypsum	
	Total (anhydrite)	119,688	108 807	—	$ 734,441
Salt					
Canadian Salt Co.	Pugwash, Cumberland County	726,440	660 400	205	
Sifto Salt Division Domtar Chemical Group	Nappan, Cumberland County	70,780	64 345	85	
	Total (salt)	797,220	724 745	290	$31,092,290

TABLE B-2. Continued.

COMPANY	LOCATION	PRODUCTION (tons)	PRODUCTION (tonnes)	TOTAL[1] NUMBER EMPLOYED	APPROXIMATE VALUE[2]
Limestone					
Ridge Brokers Ltd.	Southside Harbour, Antigonish County	13,750	12 500	3	
Canada Cement Lafarge, Ltd.	Brookfield, Colchester County	331,978	301 798	114	
Scotia Limestone Ltd.	Irish Cove, Cape Breton County	55,000	50 000	35	
Mosher Limestone Ltd.	Upper Musquodoboit, Haliax County	103,590	94 173	36	
N.S. Sand & Gravel Ltd.	Marble Mountain, Inverness County	nil	nil	-	
	Total (limestone)	504,318	458 471	188	$ 3,845,586
Dolomite					
Scotia Limestone	Frenchvale, Cape Breton County	-	-	-	-
Barite					
Nystone Chemicals Ltd.	Brookfield, Colchester County	9,095	8 268	27	
Novex Mining and Exploration, Ltd.	East Bay, Cape Breton County	14,598	13 271	22	-
Magcobar Division, Dresser Canada Inc.	Bass River, Colchester County	1,540	1 400	4	
	Total (barite)	25,233	22 939	53	$ 1,088,650[3]
	Total for Industrial Minerals Producers	7,395,281	6 722 983	932	$74,457,994[2]

[1]total employees: mining, production, clerical, supervisory, etc.
[2]estimate from Nova Scotia Department of Mines and Energy sources
[3]processed or manufactured value

AGGREGATE RESOURCES

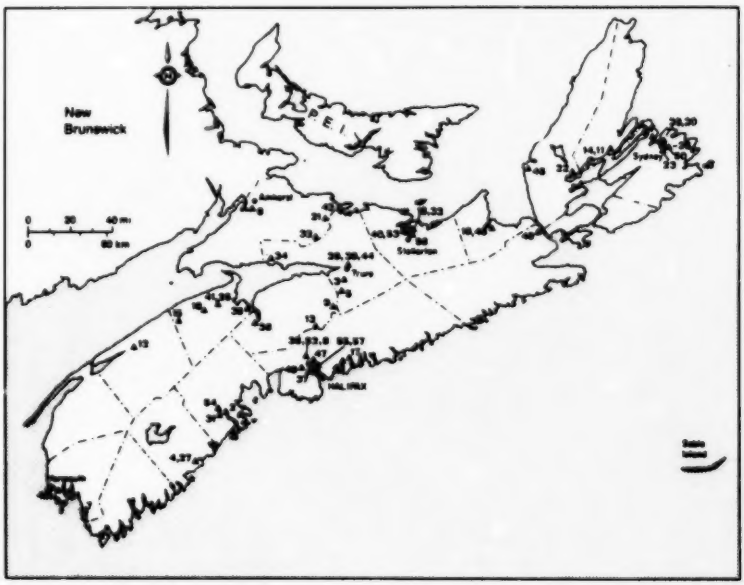
Crushed stone, sand and gravel, and granite comprise the structural materials category. Production information is summarized in Table B-3. The location of granite production is shown on Figure B-3.

Crushed Stone

The Province had 11 rock quarry operators who produced a total of 3,391,881 tons (3 104 435 t) in 1983 and employed 162 men. Individual company figures are shown in Table B-4.

Sand and Gravel

There were 46 producers of sand and gravel operating in the Province. During 1983, production was 8,097,188 tons (7 361 165 t) and 599 people were employed. Detailed production figures are shown in Table B-4.



B-3. Location of aggregate materials operations

TABLE B-3. Aggregate materials production, 1983

COMPANY	LOCATION (Head Office)	PRODUCTION (net tons)	PRODUCTION (net tonnes)	NUMBER EMPLOYED	APPROX-IMATE VALUE
Sand and Gravel					
1. Aberdeen Paving Ltd.	Halifax, Halifax County	770,000	700 000	100	
2. Acadia Road Contractors Ltd.	Bridgewater, Lunenburg County	285,450	259 500	16	
3. D.J. Benjamin Ltd.	Brookfield, Colchester County	1,625	1 478	1	
4. Budget Paving Ltd.	Liverpool, Queens County	11,978	10 889	7	
5. Gordon F. Creelman Ltd.	Stewiacke, Colchester County	38,582	35 075	1	
6. Cumberland Paving & Contr. Ltd.	Amherst, Cumberland County	66,000	60 000	5	
7. Gus D'Eon Excavating Ltd.	West Pubnico, Yarmouth County	38,356	34 869	4	
8. Dexter Construction Ltd.	Bedford, Halifax County	220,000	200 000	7	
9. Dillman Enterprises Ltd.	Shubenacadie, Colchester County	716,142	651 038	55	
10. Dominion Atlantic Railway (C.P.R)	Saint John, New Brunswick	6,486	5 897	-	
11. Dunn Const. Co. Ltd.	Baddeck, Victoria County	126,500	115 000	5	
12. Clyde Everett (1972) Ltd.	Bridgetown, Annapolis County	21,450	19 500	3	
13. L. & M. Gallant Contr., Trucking Ltd.	Elmsdale, Hants County	27,500	25 000	2	
14. Gillis Const. (C.B.) Ltd.	Baddeck, Victoria County	1,650	1 500	2	
15. Roy Hiltz Excavators Ltd.	Kingston, Kings County	38,770	35 247	4	
16. Inter Supply Ltd.	New Glasgow, Pictou County	110,000	100 000	7	
17. Francis W. Johnson Ltd.	Head Chezzetcook, Halifax County	55,000	50 000	10	
18. Kel-Ann Transport Ltd.	Waterville, Kings County	12,865	11 696	5	
19. Kell's Enterprises Ltd.	Antigonish, Antigonish County	26,400	24 000	5	
20. L. & R. Sand & Gravel Ltd.	Sydney, Cape Breton County	38,500	35 000	2	
21. Logan Langille	Wentworth, Cumberland County	14,726	13 388	1	
22. J.P. MacInnis Trucking Ltd.	Whycocomagh, Inverness County	8,348	7 671	1	
23. Malcolm S. MacDonald Co. Ltd.	Sydney River, Cape Breton County	57,133	51 939	14	
24. Martell's Const. Ltd.	North Sydney, Cape Breton County	388,902	353 548	100	
25. Maurice's Ready-Mix Ltd.	Kentville, Kings County	18,760	17 055	1	
26. Meadows Sand & Gravel Ltd.	Sydney, Cape Breton County	99,790	90 718	5	
27. Mosher & Rawding Ent. Ltd.	Liverpool, Queens County	110,000	100 000	4	
28. Municipal Ready-Mix Ltd.	Sydney, Cape Breton County	264,000	240 000	25	

TABLE B-3. Continued.

COMPANY	LOCATION (Head Office)	PRODUCTION (net tons)	PRODUCTION (net tonnes)	NUMBER EMPLOYED	APPROX-IMATE VALUE
29. North River Sand & Gravel Ltd.	Truro, Colchester County	6,600	6 000	4	
30. Nova Scotia Sand & Gravel Ltd.	Halifax, Halifax County	418,861	380 783	24	
31. Oickle Backhoe Services Ltd.	Bridgewater, Lunenburg County	9,977	9 070	1	
32. Permanent Concrete Ltd.	Folly Lake, Cumberland County	320,308	291 189	11	
33. Pictou County Excavators Ltd.	New Glasgow, Pictou County	4,400	4 000	6	
34. Arthur Pugsley	Five Islands, Colchester County	165	150	4	
35. W.K. Sharpe & Sons Const. Ltd.	Windsor, Hants County	16,500	15 000	2	
36. Vernon H. Shaw	Avonport, Kings County	48,675	44 250	1	
37. Standard Paving Maritime Ltd.	Halifax, Halifax County	402,120	365 564	20	
38. Tidewater Const. Co. Ltd.	Lower Sackville, Halifax County	145,745	132 495	150	
39. Earle Toole Trucking Ltd.	Truro, Colchester County	18,412	16 738	3	
40. Warren Maritimes Ltd.	New Glasgow, Pictou County	400,595	364 177	16	
41. Welton Const. (1975) Ltd.	Kentville, Kings County	38,500	35 000	4	
42. Wetlands Eng. & Const. Ltd.	Malagash, Cumberland County	2,812	2 556	1	
43. Max White Excavating Ltd.	Porters Lake, Halifax County	9,512	8 648	3	
44. Will-Kare Paving & Const. Ltd.	Truro, Colchester County	94,730	86 119	6	
45. Yarmouth Concrete & Gravel Ltd.	Yarmouth, Yarmouth County	109,770	99 790	5	
46. Zutphen Brothers Const. Ltd.	Port Hood, Inverness County	1,166	1 060	1	
	Subtotal	5,623,761	5 112 595	599	$21 319 529[2]
	Non-Reporting (mainly Dept. of Transport)	2,473,427	2 248 570	-	9 376 537
	Total for Sand and Gravel Producers	8,097,188	7 361 165	599	$30 696 066

TABLE B-3. Continued.

COMPANY	LOCATION (Head Office)	PRODUCTION (net tons)	PRODUCTION (net tonnes)	NUMBER EMPLOYED	APPROX-IMATE VALUE
Crushed Stone					
47. Conrad Brothers Ltd.	Montague, Halifax County	758,193	689 266	50	
48. Construction Aggregates Ltd.	Mulgrave, Guysborough County	550,000	500 000	22	
49. Gateway Materials Ltd.	Kearney Lake Rd., Halifax County	346,500	315 000	17	
50. LeVatte Construction Company Ltd.	Sydney, Cape Breton County	258,500	235 000	11	
51. Colin R. MacDonald Ltd.	Antigonish, Antigonish County	18,700	16 998	7	
52. Rocky Lake Quarry Ltd.	Bedford, Halifax County	715,000	650 000	22	
53. Satellite Equip. (1972) Ltd.	New Glasgow, Pictou County	206,916	188 106	10	
54. South Shore Sand & Gravel Ltd.	Bridgewater, Lunenburg County	110,272	100 248	8	
55. Steed & Evans Ltd.	Dartmouth, Halifax County	88,000	80 000	6	
56. S.W. Weeks Const. Ltd.	New Glasgow, Pictou County	86,900	79 000	3	
57. W. Eric Whebby Ltd.	Dartmouth, Halifax County	275,900	250 817	6	
	Total for Crushed Stone Producers	3,391,881	3 104 435	162	$15,429,041[2]
	Total for All Aggregate Production	11,489,069	10 465 600	761	$46,125,107

[1]Locations of Head Offices are shown by number on Figure B-3.
[2]Estimate from Department of Mines and Energy sources.

TABLE B-4. Miscellaneous materials production, 1983

COMPANY	LOCATION	PRODUCTION (tons)	PRODUCTION (tonnes)	TOTAL[1] NUMBER EMPLOYED	APPROXIMATE VALUE[2]
Clay					
L.E. Shaw Ltd.	Lantz, Halifax County	22 154	20 140	68	
	Shubenacadie, Halifax County	-	-	-	
Shale					
L.E. Shaw Ltd.	Milford, Hants County New Glasgow, Pictou County	21 954	19 958	included in above	
	Total (clay and shale)	44 108	40 098	68	$ 661 617[3]
Silica Sand					
Nova Scotia Sand and Gravel Ltd.	Nine Mile River, Hants County	16 500	15 000	8	$ 420 000[3]
Dimension Stone					
Heritage Memorials Ltd.	Quarry: Nictaux, Annapolis County Plant: Windsor, Hants County	6 000 ft.[3]	180m[3]	24	$ 36 000
Arsenault Monument Works Ltd.	Quarry: Loch Katrine, North Grant, Antigonish County Plant: Antigonish, N.S.	-	-	8	
	Total (dimension stone)				